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Vol. CCXXXIX No. 6115 — LONDON, OCTOBER 31, 1952 — PRICE 8d

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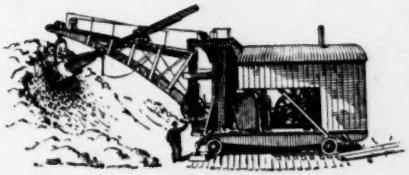

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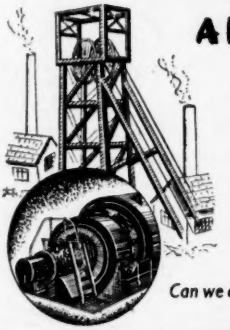

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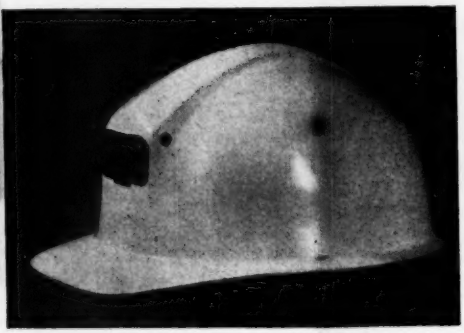

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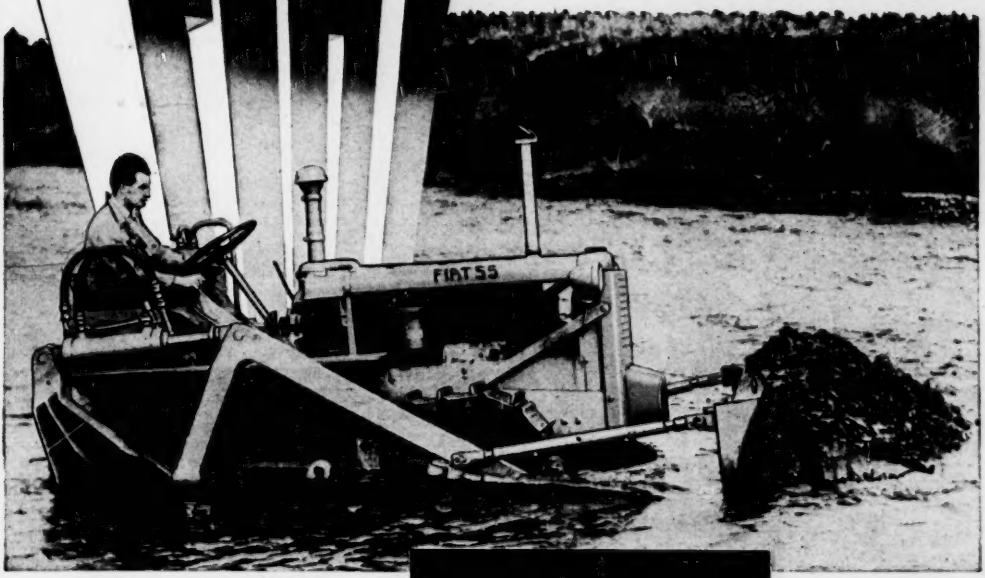

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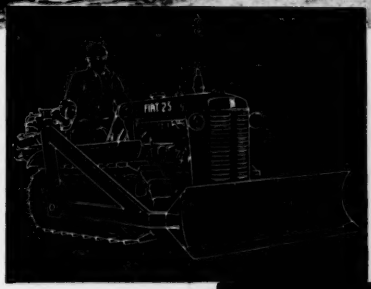

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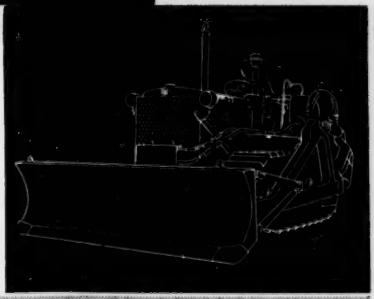

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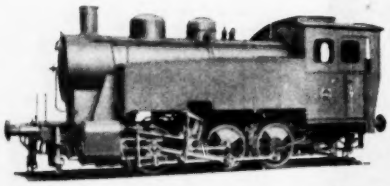

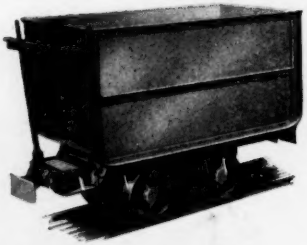

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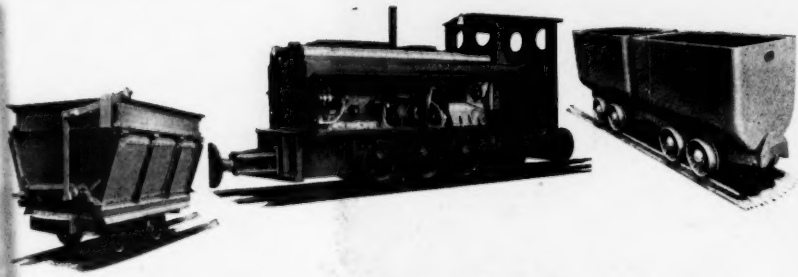

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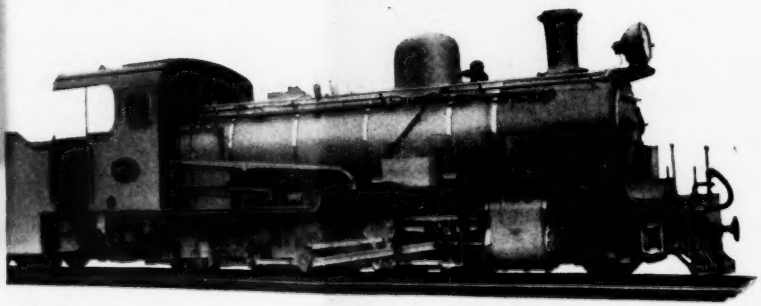

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NOTES AND COMMENTS

Proposed Aluminium Project in Alaska

The proposal of the Aluminum Co. of America to establish an aluminium smelter in the Taiya Valley District near Skagway, Alaska, recently received the approval of Mr. O. L. Chapman, United States Secretary of the Interior, who stated that the Department of the Interior would favour permanent industrial construction in the territory.

At the moment Alcoa has not officially approached the Department with regard to the purchase of the necessary land. Although it is understood that the installation would require a land area of approximately 20,000 acres, the Department can sanction the sale of only 160 acres of public land without special legislation, as was reported in *The Mining Journal*, October 17 (p. 436). Nevertheless, officials of the Department have generally expressed approval of the plan, and a spokesman for the secretary has said that the Department would not oppose legislation which would allow Alcoa to purchase the required acreage.

While final plans have not yet been completed, it is understood that as soon as the necessary land can be purchased and Governmental approval obtained, Alcoa contemplates a construction programme planned in two phases. The first will entail the starting of the first Alaska unit in late 1957. This initial unit, costing $400,000,000, would have an annual productive capacity of 400,000 s.tons of aluminium, while the second unit would be constructed later at a cost of $300,000,000 to double the capacity to 800,000 s.tons of aluminium per year. No reports have indicated that any opposition is expected on the point of purchase of the land. However, Alcoa is understood also to be wanting Washington to approve accelerated amortization of half the cost of construction, and it is questionable whether this will be granted. Should the request be rejected, Alcoa might review the situation, and might postpone its proposed Alaskan construction programme until the pressure for increased aluminium capacity has increased further.

Should the amortization request be granted, the company will then apply to Canada for the necessary water rights, as it intends to divert the waters of the Yukon River to create cheap hydro-electric power.

It is thought that Canadian officials would in general welcome a large scale industrial development so near the Canadian border, but in this particular case there has already been some comment in Canada on the point of Canadian water resources being used to develop competition with Canada's own aluminium industry. This industry is highly important to Canadian economy. Nevertheless, if Canada approved the water rights, Alcoa will then try to raise the necessary $400,000,000 to $700,000,000 through private financing, either by borowing or issuing additional stock.

The proposed site for the Alaska project of Alcoa is in the Taiya Valley, about 10 miles from Skagway. The majority of the equipment and construction material would be carried by ship from U.S. suppliers to Skagway. The final ten miles of overland transportation would be covered either by the erection of a railroad or by truck haulage. It is understood in New York that the White Pass and Yukon Railway wishes to construct the railroad, but it appears by no means certain as yet that this company would get the contract. Because of this relatively short distance which must be covered on land, present uncompleted plans envisage that overland transportation between Skagway and Taiya Valley would be accomplished by a combination of both railroad and truck haulage. Aluminium from the proposed plant would mainly be supplied to the American market.

While the above note, based on a Reuters report, states the difficulties Alcoa must overcome to carry their project to completion, it does not adequately reflect the Canadian attitude to the erection of a large aluminium refinery which will constitute a direct threat to the success of Alcan's giant refinery now under construction at Kitimat, British Columbia. Indeed, it is felt that the Alaskan venture which aims at an annual output of 800,000 tons a year will not only place Kitimat at a serious disadvantage for the sale of its metal but will also dim the prospect of this imaginative enterprise attaining its projected expansion into a plant with a capacity of 500,000 tons a year.

Thus the question of granting Alcoa the right to divert the Yukon River to develop cheap hydro-electric power would appear to be far from settled, and it seems logical to assume that both the Canadian Government and the

provincial government of British Columbia will seriously consider all aspects of this situation before signing away rights to the detriment of what must be considered as a valuable Canadian asset and engineering achievement.

Aerial Geological Mapping by Helicopter

It is not long ago that mining authorities in Canada were alarmed at the shortage of trained geologists felt in every province of the Dominion. In *The Mining Journal* of May 16 last, the Hon. W. S. Gemmel, former Minister of Mines for Ontario, was reported as having announced in the Ontario Legislature that it was almost impossible to obtain geologists for the geological branch of the Department.

More recent reports, however, indicate that by use of helicopters for geological mapping the pressing shortage of trained geologists has, to a considerable extent, been offset by effective utilization of these machines. Mr. George Prudham, Minister of Mines & Technical Surveys, announced this month that aerial geological mapping through the use of helicopters in the last field season in Canada, had proved eminently successful. During the period, five geologists using two helicopters, accomplished at approximately the same cost survey work that could only have been completed by a ground party in twenty-five years.

The airborne party of Federal Government geologists mapped some 57,000 sq. miles in the North-west Territories during this summer. The area lies just west of the Hudson Bay between the 60th and 63rd parallels, and extends west to approximately 102° W. longitude. The survey results will be published on a scale of 8 miles to the inch, and permit the selection of those areas which warrant more detailed study and mapping. The survey proved large areas of the territory to be good prospecting grounds, and it may one day be the scene of considerable mining activity.

As it is, thousands of sq. miles of Archaean Greenstone were mapped, and it is significant that the presence of this type of rock with which mineral deposits in the pre-Cambrian Shield are largely associated, forms a lie from which a "very considerable part" of the mineral wealth of Canada is derived. The discovery of Greenstone was but a single valuable result of the experimental use of helicopters in aerial survey work, and it thus appears that if the mineral potentialities of Canada's vast northern territories are to be assessed within the foreseeable future, then the traditional survey transportation of canoe and ground coverage must give way to aerial survey methods.

European Team Studies U.S. Magnesium Plants

The lightest of all structural metals, magnesium, is becoming increasingly important for industrial production and currently, a team of fifteen European experts on magnesium production from five Western European countries is in the United States on a four week tour of American magnesium plants.

At the request of the Organization for European Economic Co-operation, the Mutual Security Agency is sponsoring studies by metallurgical and chemical engineers, plant and production managers and technicians from the United Kingdom, Austria, France, Italy and Western Germany under its Productivity and Technical Assistance programme. The purpose of the tour is to study American magnesium fabricating and casting methods for comparison with those used in Europe. Dr. J. L. Haughton, metallurgical consultant with Essex Aero Ltd., is acting as technical secretary of the group, of which Mr. E. F. Mallard, chief metallurgist and chemist of the same firm, is also a member.

Mining in Cornwall

(From Our Own Correspondent)

Redruth, October 24

At Geevor Mine where the annual report published in the summer showed another good year in spite of increased taxation (the excess profit levy for three months only which applied last year amounted to no less than £11,075) the important crosscut north at the 9th level which is being driven to cut the Boscaswell lodes, made good progress as did other development. The new compressor house is now completed and the compressors are being installed so that the new electric hoist can be erected behind the existing hoist and on the site of the present compressors. In this way, it will be possible to make the change-over without interference with production. A small number of Italian workers have been introduced underground.

At South Crofty Mine, twenty Italians have also been engaged and it is hoped to recruit more shortly whilst a hostel has been erected which can accommodate about fifty workers. There is little else to report from this mine except that a main drive to connect to the Roskear shaft has been started.

At Castle-an-Dinas Mine, it has been decided to deepen the main shaft and explore at a great depth for wolfram in view of the results of recent diamond drilling which has indicated that the granite contact is inclined steeply southwards beneath the bottom of the present workings.

The Malayan Tin Syndicate's operations on mine residues at Basset near Redruth continue but of late old sand residues have been treated in the main, being derived from the Grenville mine area, which adjoins Basset to the south.

Other small operators include plants for treating beach sand in the Gwithian bay and one for residues in the Carnon valley as well as long standing operators on old and current residues such as the Tolgus Tin Stamping Co. Ltd.

OLD PROPERTIES REOPENED

A new prospect is that of Wheal Edward, situated near the old Botallack mine on the Land's End peninsula, which is being reopened and sampled for uranium by a private operator, Mr. Stein. Some uraniferous ore has been mined and sold, a full account appearing recently in *The Mining Journal.*

In the eastern part of Cornwall, the Trebartha-Lemarne mine is also being reopened by the Wolfram Prospecting Syndicate Ltd. (in which the London and Scandinavian Metallurgical Co. Ltd. have a considerable interest) and is situated on the eastern margin of the Bodmin Moor granite.

The workings which are about 120 ft. below adit have now been pumped out and although it appears essentially to be a small mine, it promises to have the makings of a good one. Excellent wolfram values are reported in sampling and some cassiterite and arsenopyrite is present as well as fluorite and a certain amount of scheelite. It is understood that an extensive development programme is to be undertaken including cross-cutting to other lodes believed to exist.

At New Consols Mine, considerable cross-cutting has been carried out during the past few months and some lodes discovered but values have been somewhat disappointing.

Western United States

(From Our Own Correspondent)

Portland, October 1

The recession in the prices of lead and zinc, sustained now for four months, has brought about the inevitable reaction from the mines. Those that have been operating on a narrow margin have been faced with the alternative of operating at a loss or closing down and many have chosen the latter. This applies not only to the small properties, of which about forty in New Mexico alone have ceased operations but in some cases to those of well financed companies although most of the latter are expected to stick it out until there is a turn for the better.

In Washington American Zinc, Lead and Smelting Co. has closed its Lead Hill mine in Pend Oreille County and the San Xavier mine of Eagle Picher, one of the largest zinc-lead producers in Arizona, with a 400 ton mill, has been forced to take the same action. Magma Copper Co. and Shattuck Denn, both Arizona, state that they will be obliged to discontinue their zinc-lead operations unless there is an improvement in the market soon. Shattuck Denn is the leading producer in Arizona which ranks as second zinc producer in the United States. In Nevada, Combined Metals Reduction Co., leading producer in that State, makes a similar announcement but states that it may continue operation by mining its high grade reserves. That the situation is regarded as only temporary is evidenced by the fact that exploration and development campaigns are being continued.

Tension in the copper situation is being relieved somewhat by the news that Phelps-Dodge, Anaconda and American Smelting and Refining have reached wage agreements with Mine, Mill and Smelter Workers' Union which will obviate a strike in the copper mines of those companies. Kennecott, the remaining member of the "Big Four," has not reached an agreement at this writing and a strike has been authorized but has not yet taken effect.

By intensive shipping operations the steel companies expect to make up for the loss of iron ore production during the 54 day strike in the steel industry so as to keep the furnaces operating during the winter. The Great Lakes, through which the ore must be hauled from mine to mill, are icebound during the winter months and it is necessary for the furnaces to stockpile a winter's supply before navigation closes.

CALIFORNIA

The Leviathan sulphur deposit in Alpine County is being given an intensive exploration by means of diamond drilling to determine the extent and depth of the ore. The property has been acquired by Anaconda for the purpose of making sulphuric acid to leach the oxide ores at its operation at Yerington, Nevada, 60 miles distant.

IDAHO

Another sulphuric acid plant is in the making near Kellogg in the Coeur d'Alene district where Sullivan Mining Co. has signed contracts for construction of a plant of 250 tons daily capacity to manufacture the acid from the fumes of its nearby electrolytic zinc plant. Sullivan is owned jointly by Hecla and Bunker Hill and Sullivan.

Gibbonsville Mining and Exploration Co. has acquired a large tonnage of mill tailings which accumulated behind a restraining dam built on the South Fork of the Coeur d'Alene River a half-century ago and is building a 400 ton mill for their treatment. As these tailings were discharged before the development of the flotation process they contain recoverable amounts of zinc and lead, principally the latter. They will be excavated by dragline and trucked to the mill where they are passed through a trommel, the oversize of which is rejected and the undersize passed to a vibrating screen. Screen product will go to a Dorr thickener, thence to a conditioner and to Denver flotation cells which make a bulk zinc-lead concentrate with lead predominating.

NEVADA

The feasibility of using commercial power produced by nuclear fission is being given serious consideration by the Atomic Energy Commission at the behest of the Nevada Atomic Power Utilization Committee, a state agency. The power is sought in connection with the operations of Eureka Corporation (Ventures, Ltd.) in Eureka County. After a well planned diamond drill exploration which located faulted segments of rich ore bodies that had been highly productive Eureka started development but the Fad shaft, the principal working adit, was drowned out at the 2,500 ft. level and so far efforts to unwater it have been unsuccessful. A major obstacle has been the cost of Diesel power which the company has been obliged to generate itself and from a study by the state committee it is believed that atomic energy could bring power costs to a figure at which the company could afford to operate. The stakes are high as the preliminary exploration indicated gold, silver, lead and zinc ores of a gross value of $175,000,000. Obviously if A.E.C. undertakes construction of such a plant it will attract world wide attention.

Key West Nickel and Copper Corporation is constructing a mill at its mine in Clark County for leaching the nickel and copper content of its ores and recovering the platinum by concentration. The property has been known for a half century but metallurgical problems have prevented successful treatment of the ores.

UTAH

Calera Mining Co. (Howe Sound) has commenced operation of its cobalt refinery at Garfield. At present it is operating on 35 tons daily of copper-cobalt concentrates containing 20 per cent cobalt from Calera's Blackbird mine in Idaho. The plant is the first to use the newly developed "Chemico" process on a commercial scale.

American Smelting and Refining Co., Kennecott Copper Corporation and Stauffer Chemical Co. of San Francisco have combined to erect a $5,000,000 plant at Garfield for the manufacture of phosphate fertilizer with the possible recovery of by-product uranium and vanadium. Output of fertilizer is planned at the rate of 60,000 tons per annum by acid leaching. Stauffer is a very large chemical manufacturing company and Kennecott and A.S. and R. own the Garfield Chemical and Manufacturing Co. whose plant manufactures 700 tons daily of sulphuric acid from smelter fume. There are immense deposits of phosphate rock throughout the Intermountain Region and there have been notable developments in recent years, especially in Idaho and Montana.

WASHINGTON

Kaiser Aluminum and Chemical Corporation has put the eighth potline in operation at its Mead plant which gives this plant an annual capacity of 350,000,000 lb. and makes it the largest of its kind in the country. It is also installing a $4,000,000 fume control system which will involve 13 miles of steel pipe and ducts.

The Lubumbashi Smelter at Elisabethville, Belgian Congo

The Lubumbashi smelter, operated in the Belgian Congo by Union Minière du Haut Katanga, was visited by the author of the following article, Mr. Leo A. Lyons, during 1951. His observations of this efficient copper extraction industry were first published in *Chemical Engineering and Mining Review*, Australia.

Of considerable interest to copper smelters is the Lubumbashi metallurgical plant of Union Minière du Haut-Katanga at Elisabethville, Belgian Congo. This plant retains the blast furnace for copper smelting instead of the reverberatory installation now generally encountered in modern copper metallurgy.

Historical reasons probably explain this, the plant having been constructed in 1910 to produce "black" copper from rich oxidized ores by reduction smelting. Raw materials subsequently contained an increased proportion of fines, so small Dwight-Lloyd sintering machines were installed. With the depletion of suitable oxidized ores and increasing tonnages of sulphides, larger sintering machines became necessary, and matte-smelting has been adopted almost to the exclusion of black copper production. Matte was at first exported, but equipment for its conversion to blister copper was later added, so that, to-day, the principal plant units comprise:

(1) Three Dwight - Lloyd sintering machines, 5 ft by 66 ft.

(2) Four water - jacketted blast furnaces, approximately 4 ft. 6 in. by 20 ft. at the tuyeres.

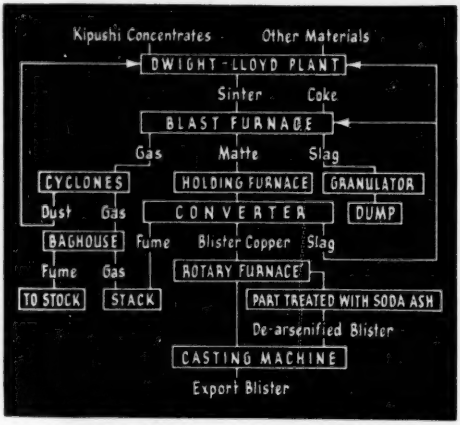
(3) Slag granulation and disposal plant.

(4) 125-ton matte holding-furnace.

(5) One converter, 13 ft. by 30 ft.

(6) 100-ton holding-furnace and casting machine for blister copper.

(7) Dust and fume collection equipment, consisting of balloon flues, cyclones, and baghouse.



Flowsheet of the Lubumbashi metallurgical plant

SINTERING

The principal raw material is flotation concentrate from Prince Leopold Mine concentrator at Kipushi, 19 miles from Elisabethville. This concentrate contains: 28 to 30 per cent Cu, 12 per cent Zn, 14 per cent Fe, 26 per cent S. Other sinter charge components include oxidized ores, which are important in supplying silica as well as copper. Smelter by-products such as granulated converter slag and flue dusts are added as necessary, while returned sinter fines are re-circulated to the extent of 110 per cent of the other feed materials.

Ignition of the charge is by stoker-fired coal-burning stoves. Depth of bed and machine speed are adjusted to prevent the cake being sintered right through. In this way, cadmium is retained, being collected later in the blast furnace baghouse fume. Before discharge from the pallets, sinter is sprayed with water and roughly broken by spiked rolls. Its composition is: 30 per cent Cu, 11 per cent Zn, 15 per cent SiO_2, 12 per cent Fe, 12 per cent S. Physical quality is excellent.

SMELTING

The black copper process has been progressively displaced by matte-smelting until there are now only four weeks of direct reduction operations annually. Metal produced in black copper campaigns is sent to Jadotville, 80 miles away, U.M.H.K.'s centre for electrolytic refining. Currently, some 70,000 to 75,000 tons of blister copper per year are derived from matte-smelting and converting at Lubumbashi, with a further 100,000 tons by leaching and electrolysis at Jadotville.

For matte-smelting, screened sinter, to which a little green concentrate and lump converter slag have been added, is delivered to the blast furnace in side-tipping trucks. Coke (obtained from Wankie, Southern Rhodesia, 735 miles away) is required, in ratio about 10 per cent of charge. Air is supplied to the shaft through nineteen 6 in. tuyeres, volume being 33,000 cu. ft. per min. at 24 oz. per sq. in. pressure.

Burden smelted is up to 1,300 tons daily, six days per week, with no smelting on Sundays through shortage of raw materials. Settling of matte from slag is effected inside the furnace crucible, there being no forehearth. Tapping is thus intermittent, in the manner of a lead furnace.

SLAG DISPOSAL

Slag flows through a small, firebrick-lined matte trap to the granulation launder. It is swept by a strong water jet to a quenching pit from which the granules are removed by perforated grabs travelling along monorails. Slag is then deposited in automatic dump-cars for conveying to the top of a high conical dump.

This dump must be one of the world's richest zinc deposits, for it contains 6,000,000 tons of slag, carrying 700,000 tons of metallic zinc. To-day's slag is even richer, assaying: 16 to 17 per cent Zn, 1.1 per cent Cu, 31 per cent SiO_2, 22 per cent Fe, and 5 per cent each of CaO, MgO, and Al_2O_3.

Matte is accumulated for the converter in a reverberatory furnace fired with pulverized coal. Grade is one of the world's highest, being 64 to 65 per cent Cu and only 5 per cent Fe. Zinc, not entirely eliminated in slag or fume, is over 5 per cent; sulphur content is 21 per cent; lead, 2.5 per cent; and arsenic (important insofar as it influences subsequent treatment of blister) exceeds 0.3 per cent.

Converting also exhibits unique features. The production of 70,000 tons of blister annually from a single vessel is a splendid performance, achieved by careful control of operating temperature, maintenance of uniform temperature between blows by firing with pulverized coal, and perhaps most important of all, perfecting of a system of "hot-patching."

The refractory lining is of dead-burned magnesite brick, made at Vereeniging, South Africa. Brickwork is 21 in. thick at the tuyere zone and there are fifty 2 in. tuyeres at 6 in. centres. Generally, 25,000 to 30,000 tons of blister is produced before replacing tuyere bricks. Air supply is 23,000 to 27,000 cu. ft. per min. at 16 lb. per sq. in. pressure. Operating temperature is maintained around 1,225° C. by the addition of cold matte as "dope" before slagging and by the doping of copper scrap after slag has been skimmed. Temperature is recorded at 10 min. intervals on a Micromax instrument. Slags are less fluid than normally encountered and have a typical analysis of: Cu, 12 to 17 per cent; ZnO, 20 per cent; SiO_2, 20 per cent; FeO, 28 per cent; PbO, 7 per cent.

During a converter cycle, the vessel is charged with a total of 85 tons of molten matte, cold dope, and siliceous fluxing ore (75 per cent SiO_2, 4 per cent Cu). Two pours of slag are obtained and 50 tons of copper remain when the blow is complete. Pulverized coal is burned in the converter between cycles of which there are six daily.

The monolithic patching procedure cannot be described fully here. Briefly, it consists in the application of a crushed magnesite-pitch mixture at the tuyere zone when newly bricked and again at intervals as the tuyere bricks become reduced in thickness. Refractory remaining at the tuyeres is measured at the end of every blow.

BLISTER CASTING

Blister copper is transfered by cast steel ladles, lined only with a skull of blast furnace slag. It is poured into a cylindrical holding furnace, 10 ft. dia. by 25 ft. long, lined with magnesite brick and mounted on a stand similar to a converter stand. Capacity is at least 100 tons.

One-quarter of the daily production of 300 tons is oxidized by blowing with compressed air, introduced through iron pipes inserted below the surface of the bath. Soda ash is then injected by means of a compressed air gun, and an arsenate slag skimmed off manually. Arsenic content of blister is reduced from 0.2 per cent to less than 0.05 per cent by this treatment.

Casting is through a spoon to a straight-line machine; slabs average 350 lb. weight. Copper content of untreated blister is 98.9 per cent. De-arsenified blister is also lower in lead (0.1 per cent against 0.2 per cent), but assays only 99.0 per cent Cu because of higher oxygen content.

GAS, DUST AND FUME

Dwight-Lloyd gases are led through cyclones (one per machine) and then to the 492 ft. brick stack (one of the world's tallest). Blast furnace gases pass through a balloon flue to a battery of 32 cyclones, then to an intensive-type bag-house, which is called upon to filter 65 m^3 of gas per second at 95 to 100° C. There are 44 separate units, each containing 36 bags of 2 m^2 area. These are shaken automatically for 5 sec. every 18 min. Bag life is six to nine months. Collected fume contains: 37 per cent Zn, 23 per cent Pb, 9 per cent S, 7 per cent As, 4 per cent Cd. It is stockpiled pending erection of a cadmium recovery plant. Of considerable interest is the fact that the fume carries 0.25 per cent germanium. Union Minière is said to be able to produce large quantities of this element.

When the converter is blowing, a dense white fume is emitted by the stack. Converter fume is rich in zinc but passes directly along a balloon flue to the stack without filtration.

DESTINATION OF BLISTER COPPER

Most of the copper from Lubumbashi is despatched to Belgium for electrolytic refining at the plant of Societé Genèrale Metallurgique de Hoboken. There, a silver content of 2 kg. per tonne is recovered.

Total copper output of the smelter, since commencing operations in 1911, is in the vicinity of 2,000,000 tons—roughly half that of all the Union Minière plants. The proportion now is less than half, as a result of expansion of leaching and electro-winning at Jadotville, but production is expected to be maintained near 75,000 tons annually for the next decade.

It is worth remarking that all this is achieved by negroes working under European supervision. The writer's opinion is that the African worker is at least as efficient as his Australian counterpart under similar operating circumstances.

Mechanization in the Symetain Tin Placers

A paper was presented recently before the Institute Royal Colonial Belge by M. R. Antoine which described the growth of mechanization in the operations of the Symétain Co. Symétain operates in the Maniema area in the Belgian Congo between 26° and 27° 30′ east and 1°-3° 30′ south. There are two main centres Punia, in the north, and Kalima, in the south. Kalima is 250 km. distant from Costermansville, the capital of the province.

Production by the Symétain began in 1932; apart from a short decline in 1939, production rose more or less steadily to the end of the war reaching a total of about 4,600 tonnes in 1945, thereafter it declined gradually until the tin boom of 1950-1951, at the end of which year it had recovered to about 3,900 tonnes.

During the later years of the company's working, mechanization has been increasingly introduced and lower grade material rendered economic. The cost per cu. metre of ground worked reached its highest figure in 1948 when it stood at 191 as compared with 100 in 1939. Since then the cost has been reduced steadily to 153 in 1951. The increase in mechanization has reduced the labour force and diminished the difficulties of recruiting from distant areas and providing for the standards set by the government for the comfort of the workpeople. As regards the progressive reduction in the grade of ground treated and the consequent increase in the ore reserve in 1951 the grade of wash per cu. metre worked was brought down to 170 grammes.

Generally speaking methods of treatment follow conventional lines. After stripping the overburden by dragline, hydraulicing is used to break down the stanniferous ground, usually 5 to 6 metres in depth, and when necessary the wash is elevated by 6 in. or 8 in. gravel pumps or ejectors to grizzlies discharging on to classifiers and passing to agitation vats and thence to pulsator jigs and shaking tables. The concentrate is finally put through a magnetic separator to separate wolfram, tantalite, ilmenite and rare earths from the cassiterite.

As much scaffolding is required to carry pipelines, launders and sluice boxes it has been found economical to use tubular scaffolding in place of the wooden poles cut from the forest, as the wooden poles lose their strength a few months after being cut and in any case cannot be recovered. Extensive use is also made of travelling belts. A hydro-electric power plant installed at Kalima was completed last year.

The Extraction and Possible Uses of Rhenium

By GRAHAM OLDHAM, B.Sc., F.R.I.C., D.L.C., M.Inst.F.

Credit for the discovery of rhenium in 1925 may be attributed to several scientists, and at the present time the metal appears to have potential uses in the electrical industry and as a catalyst. Rhenium must be regarded as a rare metal, although its appearance in industrial wastes and the flue dusts from molybdenum extraction plants offers a reasonable source of supply. The following article outlines the history, extraction and possible uses of rhenium, and indicates a possible revival of interest in the metal in the future.

Credit for the discovery of rhenium is usually given to the German workers, Noddack, Tacke and Berg who first reported its discovery in 1925. A proportion of the credit is however, undoubtedly due to the English workers Druce and Loring and the Czech workers Heyrovsky and Dolejsek whose announcements of their discoveries came some few months later. The Noddacks (Fräulein Tacke married Dr. Noddack in 1926), claimed to have obtained rhenium from platinum ores and from columbite, but both of these sources seem subsequently to have been abandoned, the most important ore now being molybdenite, some samples of which have been reported as containing up to 0.33 per cent of rhenium.

Rhenium has also been reported in industrial wastes such as anode sludge in Norway, flue dust from copper and zinc refineries and in the slag from gold extraction at Zmeinogorsk in Siberia. According to Bibikova[1], 90-92 per cent of the total rhenium content of a molybdenum glance concentrates in the flue dust. The element is also to be found in commercial ammonium molybdate and in molybdenum metal itself in the former case in amount up to 0.4 per cent.

In 1930, I. and W. Noddack took out a patent[2] for the extraction from molybdenum ores in which the process was, briefly, as follows: The ore was treated with nitric acid and molybdenum removed by the addition of phosphoric acid and ammonium nitrate. The rhenium, together with other elements, was converted to the sulphide with hydrogen sulphide. The sulphide was converted to oxide and a rhenium-rich concentrate finally obtained by fractional sublimation. Other workers claimed to have obtained the element from manganese ores but this does not seem to have been a particularly satisfactory source.

Driggs, in 1933[3] patented a method in which ores or concentrates of rhenium are heated with sodium bisulphate and sodium nitrate. The rhenium forms the heptoxide which is volatilized and then converted to the sulphide. This is then heated in hydrogen at 1,000° C to form the metal.

RECENT WORK ON EXTRACTION

From these early beginnings, more elegant methods have been devised and a few recent patents will now be reviewed. In July, 1950, a French patent[4] was claimed for the extraction of rhenium from molybdenite obtained from a copper sulphide ore. The ore is roasted in a furnace in a current of air until oxidation begins, when the air supply is regulated so as to keep the temperature of the furnace at 600° C. During this oxidation phase, the furnace gases are mixed with cool air and passed through a number of cyclones. At the conclusion of the oxidation, the external heating is adjusted to maintain a temperature of 600° C. when the rhenium is converted to the heptoxide which sublimes. At this second stage, the furnace gases and cool air are passed to a multicyclone at 250-300° C. and thence to a washing tower through which water or a weak solution of rhenium salts is passed to collect the rhenium. It should perhaps be pointed out here that the volatilization of the heptoxide only starts after the sulphur of the molybdenite has been substantially removed. Further, the molybdenum sulphide ore is initially separated from the copper by selective flotation. Such a process has also been claimed in the United States in 1951.[5]

In an alternative method also patented recently[6] the molybdenite is treated with an acid or alkali and the pH of the extract adjusted to between 8 and 9. To this extract is added a solution in chloroform of a compound such as tetraphenylarsonium chloride. Tetraphenylarsonium perrhenate is formed and passes into the chloroform layer which is removed. This is then treated with a concentrated acid, hydrochloric is mentioned in the patent as being suitable, and the rhenium compound extracted. This method illustrates the increasing use which is being made of organic solvents in the extraction of rarer metals; other examples being found in the extraction of uranium, gallium and germanium, etc.

A patent for the extraction from flue dust has been claimed by Melaven and Bacon.[7] The dust is leached with water and the filtrate from the leachings cooled to crystallize out any iron salts present. The rhenium is then precipitated out as potassium perrhenate by the addition of potassium chloride.

THE METAL AND ITS PROPERTIES

The metal itself may be obtained by hydrogen reduction of the oxides at above 500° C. or, alternatively, by reduction of other compounds such as the sulphides, halides, etc. The thermite reduction of the dioxide may be used and electrolytic methods in either acid or alkaline solutions have also been employed.

The metal, normally obtained as a brown black powder, may be compressed and fused into rods having a silvery white metallic appearance. The density is given as 21.04 and the melting point as 3,160° C. The metal is ductile when cold and when hot can be forged and rolled. Its tensile strength is stated to be 50.6 kg. per sq. m. with an elongation of 20 per cent.

POSSIBLE USES

At the moment, the possible uses of rhenium appear to fall into two distinct classes. Firstly, there is its use as a catalyst. As early as 1932, Tropsch investigated its action as a catalyst in the conversion of carbon monoxide and hydrogen into methane, the starting point of the now well known Fischer-Tropsch process. Rhenium alone was not very satisfactory but admixed with copper it was possible to obtain a 31.8 per cent conversion. Rhenium both in the form of the metal and as the sulphide has been claimed in a number of catalytic processes, such as the production of phenols and cresols, acetone, chloroform, etc.

Secondly, there is its potential use in the electrical industry. The use of rhenium wire as a filament for electric light bulbs and thermionic valves was claimed in 1931 since it is said to be less volatile than tungsten. Owing to its cost it would appear unlikely that it has ever been used to any great extent, if at all, for this purpose. Nevertheless, it can be used for the coating of wires and, as very thin layers may be obtained, the cost of rhenium coated wire for such purposes might not be prohibitive. Last year, R. Levi of Phillips Gloeilampenfabrieken claimed a process[8] by means of which the metal could be plated on to platinum, rhodium, chromium or nickel in thicknesses ranging from 25 to 75 x 10^{-4} mm. The electrolyte was potassium perrhenate in concentrated sulphuric acid and

the plating had to be put on in successive layers, intermediate heating to 1,000° C. being necessary to convert from the amorphous to the crystalline state.

Thin coatings of rhenium are extremely resistant to corrosion remaining unattacked by, for example, hydrochloric acid gas. The throwing power of most of the electrolytic baths appears to be very good and bright hard deposits are readily obtained. Alloys of rhenium containing at least 2 per cent of the metal are claimed to be suitable for the manufacture of pen nib tips.

It would be idle to pretend that rhenium is anything other than a rare metal. Nevertheless, its appearance in a number of industrial wastes and flue dusts from molybdenum extraction plants does offer a reasonable commercial source. Certainly recent technical and patent literature seems indicate a revival of interest in this element about which we may hear more in the not too distant future.

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Portugal

(From Our Own Correspondent)

Foz do Douro, October 6

The Official List of Mining Concessions, published recently, shows that about 4,100 concessions producing wolfram, tin, china clay, manganese, uranium, beryllium, lithium, titanium, iron and coal are on the books of the Department of Mines. Perusal of that list shows that only about 12 per cent of that total were taxed for the year 1951 as producers, the remainder being inactive.

The recent push to obtain tantalite-columbite caused a minor stir, side-tracking attention hitherto concentrated on other ores to the search for that complex material. A shipment of close on the four-figure mark was recently made to the U.S.A. of tin slag bearing a recoverable percentage of Ta205/Cb205. Beyond this it is unlikely that anything very startling will be obtained from the mines producing small quantities of the association Sn/Ta205/Cb205.

Exporters of cassiterite have been hoping that the recent steps taken by the Bolivian Government would lead to greater facilities being granted in respect to exports of tin to the U.K. than has been the case. Most unfortunately, there is little chance of the removal of the regulation requiring that 30 per cent of the invoice value be deposited with the Bank of Portugal.

Speaking generally, little interest is being shown anywhere in Portugal's main mineral production. Whereas exports of low grade iron ore are increasing, wolfram ores and tin ores and metal find a limited market. Even in the only market to which export licences can be expected the interest is limited to a few firms. That export of iron ores is on the increase proves nothing except that the international position is not all that it might be. Regarding the exports from January to August, the figures show that U.K. is once again close to U.S.A. as regards purchases of WO_3 but well behind as regards tin ore.

The annual report for the Panasqueira Mines (Beralt) and the San Domingos Mines (Mason & Barry) have been read with much satisfaction by Britons resident in Portugal. Firms such as these are better ambassadors than any revaluation of the pound sterling.

REVIEWS

Tungsten, a Treatise on its Metallurgy, Properties and Applications.—*By Colin J. Smithells, M.C., D.Sc., F.I.M. Third Edition. Pp.* 326 *with illustrations and index. Published by Chapman & Hall, Ltd. Price* 75*s. net.*

In a preface the author states that since the last edition of this work appeared fifteen years ago, considerable developments have taken place both in the methods of manufacture and in the industrial applications of tungsten. In this edition, therefore, the author has assumed the role of editor, with the majority of the chapters contained in the work rewritten by experts in the various fields.

The early pages speak briefly of the history of tungsten, and point out that it is very widely distributed, with its chief ores wolframite or wolfram, composed of the tungstates of iron and manganese, and scheelite or calcium tungstate. After a review of the characteristics of these ores the occurrences of tungsten deposits throughout the world are reviewed, and aspects of the lie of deposits which lend themselves to different types of mining are noted. Tungsten ores usually occur in narrow veins, although in some rich deposits the veins may be several metres wide in places. Three types of deposits have been distinguished, which in turn are described as loose surface deposits formed by weathering of the granite, partly disintegrated veins near the surface, and deeper veins providing difficult working. The first type of deposit is mainly being exploited at the moment.

From these concise and valuable introductory remarks the work continues to describe the preparation, purification and reduction of tungstic oxide. The method of making tungsten ductile at room temperature according to the method developed by Coolidge is described at length. The success eventually obtained was attributed by Coolidge "mainly to the purity of the materials used, and to obtaining a suitable crystalline structure in the metal before working." In the light of present knowledge these are important factors and although the processes used by different manufacturers vary in detail, the apparatus employed is presented as having remained essentially unchanged.

This work has been named as a book of reference, and the edition under notice can only enhance the considerable reputation of its predecessors.

Geological Survey of Great Britain.—*By Sir Edward Bailey, F.R.S. Published by Thomas Murby & Co. Pp.* 278 *with illustrations and index. Price* 22*s.* 6*d. net.*

To the geologist, the fundamental task of producing an annoted geological map supplies the materials of a story which is alive with human interest. In keeping with this tone, the author of this survey of Great Britain traces the activities of the Geological Survey from its inception in 1835 under Sir Henry Thomas De la Beche, C.B., F.R.S., to the end of the second world war, and during the period under mention his background varies continually. The announcement of glaciation and large-scale tectonics, the beginnings of microscopic petrology, as well as the discovery of radio-activity and the nationalization of coal, have each in succession very considerably affected the work of the Survey.

The work is written clearly, with a delightful lack of heavy technicalities, a method of presentation that clarifies to a marked degree and enhances the value of the whole.

Iron and Steel Works of the World.—*First Edition,* 1952. *Edited by H. G. Cordero. Published by Quin Press Ltd. Pp.* 651. *Price* 50*s.*

The first volume of a reference work which presents a comprehensive and global review of the major works in the iron and steel industry. The formation included covers five continents, over fifty countries and more than a thousand plants. All possible details are given relating to the location, capacities, products, output, capital and directors and the like of all the significant works producing pig iron, raw steel, rolled iron and steel, flat steel, tinplates and similar products.

Beautifully bound and produced, this is a valuable book of reference.

The Public Works and Municipal Services Congress and Exhibition, 1952

The Public Works and Municipal Services Congress and Exhibition to be held at Olympia from November 3 to November 8, will offer much to interest the mine and quarry engineer. The exhibition is held on alternate years, and this year will provide an impressive display. The overall scope of the exhibition embraces a wide range of equipment designed for use in mine and quarry, with many units on show for the first time. The following preview makes mention of those exhibits likely to be of particular interest to readers of *The Mining Journal*, and in subsequent issues it is intended to present several of these equipments more fully.

Mobile and stationary compressor products will be displayed on Stand 68 by *Air Pumps Ltd.* The exhibits are a selection from the company's range of mobile and stationary compressor products, and include the S.V. rotary compressor and exhauster, the V.I.A. automatic electrically driven, single stage, air cooled compressor unit, and the D. range of mobile, Diesel driven compressor units.

In complete contrast, *Thos. W. Ward Ltd.* on Stand 27, will show bulk cement transport, storage and weighbatching equipment. Plant and machinery pieces including conveyors, hoists, concrete mixers, compressors, pneumatic tools, pumps, sawbenches, loaders, electrical plant and boilers will be on display, as will a 5-ton steam loco crane with 45 ft. jib. In keeping with this tone of heavier equipment, *Thomas Smith & Sons (Rodley) Ltd.* will display the latest Smith 21 Excavator, Mark 3, on Stand 55. This machine, with a bucket capacity of ¾ cu. yd., is an improvement over its predecessor, the Mark 2.

Excavators are emphasized once more on Stand 73 where *Ruston-Bucyrus Ltd.* will exhibit their Diesel engine driven mechanical excavator, mounted on caterpillars and named the 22-R.B. Compressed air plant will be shown by *Holman Bros. Ltd.* on Stand 21, and the firm's exhibit will consist almost entirely of compressed air equipment, with Holman aid compressors represented by three versions of the latest air cooled 130 cu. ft./min. displacement model. A representative selection of rock drills, air leg mounting, drill bits, pneumatic tools and miscellaneous items will complete the display.

The British built Model 200 Carlisle Motor Grader which has been distributed throughout the world by *John Blackwood Hodge*, will be exhibited on Stand 99. The specially developed features of this unit are said to ensure maximum strength throughout, and particular attention has been paid to the critical and highly stressed areas. On Stand 74, *Newton, Chambers & Co., Ltd.* will display the latest addition to their range of N.C.K. excavators and cranes, the N.C.K. Model 605, which may be equipped as a shovel, is available with dragshovel and dragline attachments, and is quickly convertible for crane duty. A full range of mobile and stationary air compressors will be shown on Stand 149 by *Arpic Engineering Ltd.* This exhibit will illustrate certain exclusive features of design.

On Stand 65 the display of *Associated British Oil Engines Ltd.* will include exhibits by the National Gas & Oil Engine Co., Ltd., J. & H. McLaren Ltd., Mirrlees, Bickerton & Day Ltd., and Petters Ltd. The displays by the several companies will comprise Type M Diesel engines, air and water cooled Diesel engines, and air and hopper cooled petrol engines. *David Brown Tractors Ltd.* show their tractor products on Stand 138. The equipments on display will include units of the Trackmaster series as well as the Taskmaster industrial wheeled tractor with winch. Two versions of the David Brown industrial power pack engine will be shown, and a Diesel electric generator set by Dale Electric (Yorkshire) Ltd. Portable compressors of the sleeve valve type will be on show at the *Broom & Wade Ltd.* display on Stand 20. A new exhibit will be the Type S.V. 78 portable compressor. Pneumatic tools will be shown, and a special feature is to be the Broomwade Drilleg.

Crawlers and tractors are again emphasized on Stands 76 and 94, where *Marshall Sons & Co., Ltd.* and *John Fowler & Co. (Leeds) Ltd.* will stage their exhibition. Examples of the Road-Marshall types of road rollers will be shown, as will the Field-Marshall series three-wheeled tractor. Other pieces on display will include the Fowler Challenger 4 Diesel crawler tractor and Challengers 3 and 1, with other units. On Stand 40 *Nordberg Manufacturing Co.* show Symons cone and primary gyratory crushers and mechanically vibrated screens. The Symons vibrating bar grizzly will also be displayed. *Jack Olding & Co., Ltd.* will display Vickers V.R. 180 tractors on Stand 122, and in addition will show matched ancillary equipment. The V.R. 180 is manufactured by Vickers-Armstrongs and the ancillary equipment is produced by Vickers-Armstrongs & Onions.

Among the units displayed by *The Climax Rock Drill & Engineering Works Ltd.* on Stand 32, will be the Climax range of compressors as represented by the D. 25A machine, as well as a selection of the R.V. hand hammer drills with a hand hammer drill mounted on Climax Maxleg, and the firm's Wagon Drill mounting and Maxam equipment. Heavy earth moving equipment by *Ransomes & Rapier Ltd.* on show on Stand 45, will include the Rapier 423 shovel as well as trailer, concrete and truck mixers. The firm's range of mobile cranes will be exhibited in model form, as will its range of fork lift trucks and the W.1400 walking dragline. A contrast to these exhibits will be seen on Stand 203, where *Small & Parkes Ltd.* will display "Don" brake and clutch fabrics and Don Flex (Patent) clutch discs, as well as the patent grooved Roko belting, Karmal engine packings, and other products.

On Stand 33 *Atlas Diesel Co., Ltd.* will show equipment covering all the major fields in which compressed air is used in public works contracting and civil engineering. The exhibits will be divided into four sections, comprising rockdrilling and tunnelling equipment, general contracting equipment, maintenance work and constructional engineering units, and paint spraying pieces. On Stand 38 *W. H. Baxter Ltd.* display a knaping motion stonebreaker, a roller bearing granulator, and a typical vibrating screen unit, while on Stand 28 *E. Boydell & Co., Ltd.* show their 14B Quarry model and I.O.B.D. Standard dumpers, as well as the L.H.I. and S.S. Loaders.

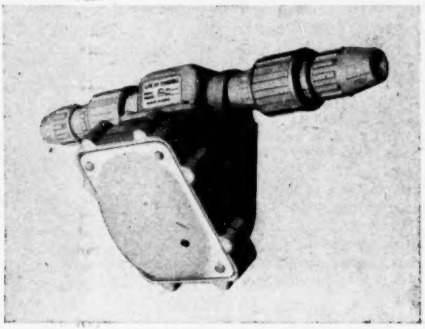
A selection of steel wire ropes which are the basis of a new simplification scheme being proposed by the wire ropemakers of Britain will be shown on Stand 11 by *British Ropes Ltd.* The ropes are said to be suitable for lifts, cranes, hoists and all types of contracting plant and excavating machinery. A unique display by *The British Rubber Development Board* includes a small cinema where films will be shown on Stand 205. The display is primarily made up of photographs of recent laying operations of rubberized roads in the Commonwealth and the U.S.A. Other rubber products are displayed by the *Dominion Rubber Co., Ltd.* on Stand 260. The firm's exhibits include conveyor belting, air, water, delivery and suction hose, and rubber flooring. Compressed air plant and equipment by *The Consolidated Pneumatic Tool Co., Ltd.* will be shown on Stand 58. Representative P.C. compressors, both portable and stationary, Feedleg rockdrilling equipment, concrete breakers, sheeting drivers and pick hammers will be exhibited, with other equipments.

Narrow gauge railway material, rolling stock and Diesel locomotives will be shown by *Robert Hudson Ltd.* on Stand 18. Among the items will be the various sections of flat bottomed rails with fish plates, steel sleepers of both corrugated and trough section with open and closed ends, and clutch bolt type sleepers. At the *Liner Concrete Machinery Co., Ltd.* exhibit on Stand 93, the units to be displayed will include a Liner Cumflow mixer, the Cloverleaf Tilting drum hopper mixer, the non-tilt mixer, the Junior and Rolpanit mixers, and other equipments including a Portasaw trailer model and a chain Portasaw. The Allis-Chalmers crawler tractor Model H.D. 15, the Fiat industrial crawler tractor models 55L, 35, and 25C, and the Onions 4 yd. Empire Scraper Model E.M. are to be shown on Stand 152 by *Mackay Industrial Equipment Ltd.*

MACHINERY AND EQUIPMENT

A New Coal Face Lighting Fitting

As the sphere of operations at a coal face is continually advancing, it is advantageous to install a portable system of lighting in which lamps follow the advancing face. The method demands that the lamps be removed regularly, the cables threaded past the standing roof supports, and the fittings again erected on props situated nearer the face. This continual advance is an essential factor in the production drive, and in order to endure the continual shifting decreed by the system, the fittings must be strong. They must, on the other hand, be light and reasonably small, as a seam height may be 3 ft.



The new G.E.C. coal face flameproof fitting for tungsten lighting

or 3 ft. 6 in., a measurement which precludes more bulky fitments.

The glare effect of any type of lighting fitting, however, is increased in a mine by this identical factor of low mounting height, and is in turn intensified in contrast with the low reflection of the surroundings. The initial lighting experiments at the coal face made by the National Coal Board used fluorescent tubes as the source of light for this reason, and lighting results achieved were excellent with no doubt remaining that the low surface brightness of the fluorescent tubes was an important factor in the results obtained.

The General Electric Co. Ltd. produces fluorescent fittings for roadway and other mine locations, and in its new coal face flameproof lighting fitting has combined portability with low surface brightness from a tungsten light source. The fitting employs a 60 W. Osram tungsten lamp, and is made flameproof by a thick armour plate front glass. An additional domed front cover of high transmission Opal Perspex provides diffusion and extra mechanical protection, with the resulting maximum brightness considerably less than that of a fluorescent tube.

The fluorescent fittings are more adaptable for service at roadways or pit bottoms where installations are of a more permanent nature, and the tungsten fittings are presented as the smaller, cheaper and lighter units. The new fittings are supplied complete with two flameproof half couplers integral with the unit for ease of coupling, and in use are normally spaced at five to six yards apart.

Other G.E.C. products are listed in *The G.E.C. Handbook*, the descendant of the *G.E.C. Bound Catalogue*, a widely used and valued electrical catalogue. The Handbook deals with a limited yet important range of G.E.C. products, all of which are manufactured in England.

The work covers what may be broadly described as "installation material," and because of changing circumstances, the prices quoted are those current during the first quarter of 1951.

Accumulators for Miners' Cap Lamps

It has been the experience of Venner Accumulators Ltd. that the majority of miners' cap lamps are operated from 6 volt accumulators with a capacity of between 10 and 12 A/H. This voltage is supplied by a Type U Venner accumulator, which is 3 in. long, 4-13/16 in. high and 2-5/16 in. in width, weighing 1 lb. 15 oz. The Venner accumulator Type C weighing ¼ oz. and of smaller dimensions, which was mentioned in our issue of October 3, is not intended for attachment to miners' cap lamps.

Production of Drier Filter Cake

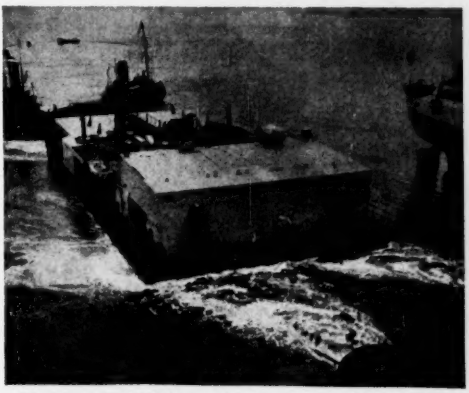
In *Bulletin F9-B3*, the Denver Equipment Co. announce that through the installation of the company's disc filters, drier filter cake may be produced because of the elimination of filtrate blow-back.

In its operation, the disc filter eliminates the blowback of filtrate trapped in the filter segment. The piece is constructed so that the filter grooves run directly perpendicular to the suction tube along the leading edge of the filter segment. The filtrate drains directly to this tube and is entirely removed.

From the capacities and vacuum required by calculations based on average lead/zinc concentrates, it is shown that the full range of disc filters can render from 1¼ to 96 tons during 24 hours. These approximate capacities grade through the 2 ft., 4 ft. and 6 ft. sizes which incorporate six discs in the 2 ft. and 4 ft. sizes and eight discs in the 6 ft., and have filter areas in the smallest size of 5 sq. ft. gradually rising to 384 sq. ft. in the largest.

Shell Maracaibo Drilling Barge Launched

On September 15 last the drilling barge (*Gabarra de Perforacion*) which Messrs. Ferguson Bros. have specially constructed for the Shell Co. was launched at Port Glasgow. A description of this barge was given in *The Mining Journal* of May 2, page 444 and it will be in effect a floating power station to power the drills operated on the platforms designed to carry the rigs erected to service the marine bores designed to reach depths of 15,000 ft. in the deepest water of Lake Maracaibo at locations up to 15 miles or more from the shore. In operation the barge will be moored within 25 to 120 ft. of



Tugs tow the Shell Maracaibo barge to a fitting out basin

the drilling platforms and is designed to be self-sustaining for a 30 day drilling campaign.

For details of installations carried by the barge the reader is referred to the article published in our May 2 issue.

The accompanying illustration shows the general appearance of the drilling barge after the launch. After testing the plant and machinery the barge will be towed to Venezula..

Submarine drilling for oil is projected by the Shell Co. in waters off the coast of British N. Borneo where a submarine extension of the Seria field is looked for.

METALS, MINERALS AND ALLOYS

The increase in the pressure on metal prices has been accompanied by the usual chorus for help from the producers. This week the Austrian aluminium producers are complaining of French competition and are asking for tax relief; negotiations are going on between the Economics Ministry in Germany and the producers of lead and zinc for the reintroduction of import duties because workers have been dismissed; and the U.S. lead miners are lobbying for relief in the shape of increased stockpiling or a higher import duty on foreign lead. The clamour from all these sectional interests has a somewhat hollow ring in the light of the apparently persistent optimism in the States. Quite apart from the good market prospects in the very long term view which emerge from the Paley Report and which we have yet to see convincingly refuted, something like a 25 per cent increase in U.S. steel production in the next five years is being forecast. It is difficult to believe that the capital expenditure required for expansion on this scale and for far greater expansion in the aluminium industry would be forthcoming without very convincing evidence that the capacity will really be required, and the fact that such programmes are in fact in hand must in itself be regarded as a bull point for many other metals, however the immediate prospects may appear.

The soft-coal miners of the U.S. have returned to work, although the wage disputes throughout Mr. Lewis' empire are far from being settled.

The D.M.P.A. is about to open an office in Singapore which will supervise U.S. procurement activities in Asia and Australasia. The principal function of the Singapore Office at this time will be to keep Washington informed of significant developments in raw materials production. This Office will not be concerned with the development of tin or rubber production and will not alter procedures under which those materials are now purchased. The U.S. Government will continue its policy of utilization of normal trade channels for procurement activities. This office will be headed by Rear-Admiral Paul L. Mather, who is expected in Singapore around November 1.

COPPER.—The multi-price system for copper in the U.S. continues to be the centre of controversy. But an effort is to be made to find a more satisfactory basis. To this end officials of the Office of Price Stabilization are to meet delegates from the Primary Copper Producers' Advisory Committee on a date as yet undecided. The industry is in favour of removing the price of copper from price control with the anticipated result of the price going to 30-33c. per lb. for copper, whether domestic or imported. O.P.S. is thought to still favour different prices for domestic and foreign metal, but is willing to remove the differences between the prices received by the domestic producers.

Last Wednesday foreign copper was for the first time since the abrogation of the Chilean contract showing signs of easing. While November deliveries were still being eagerly sought, a parcel of 4,000 tons of European copper has been offered c.i.f. New York for December delivery at 35c. Whether there is any real significance in this will become more apparent when Chile starts booking orders for December delivery in the next few days. Meanwhile the long-term picture seems to depend very considerably on American stockpiling policy. In this connection it was stated in Washington last week that the Munitions Board has requested the resumption of stockpiling but no decision on the matter has apparently been reached as yet.

As we go to press, there is no news of a settlement in the Rhodesian copper wage dispute. Attempts are being made to persuade the natives to allow their claims to go to arbitration on the grounds that the award could be no worse but might well be better than the offer made by the employers. The copper producers are reported to be re-examining their previous offer, which has been criticized on the grounds of being too complicated for the African to appreciate. A new offer, simpler in form but costing no more, is a possible development. The strike which so far has been orderly has been kept to the copperbelt.

LEAD.—Mr. Simon D. Strauss, vice-president of American Smelting & Refining, has attacked the British Ministry of Materials in no uncertain manner. In 1951, he says, the Ministry was expecting a shortage of lead and bought parcels from sources not usually used but by the early part of 1952 the Ministry reduced its purchases because its stocks were growing rapidly. Mr. Strauss also asserts that the Ministry has stated that it would make 40,000 tons of its 100,000 tons stockpile available in the last quarter of this year and that in these conditions buyers have tended to hold off. He compared the recent action of the Ministry in following the market price down with the policy of R.F.C. in fixing a price for its tin sales. We cannot help but feel that Mr. Strauss was on dangerous ground in citing R.F.C. experience as a stabilizing influence in market prices. It would also be interesting to have confirmation of his assertion that the Ministry has made any public statement as to the amount of lead it was prepared to release to the market this year.

The U.S. lead price has been pretty firm this week at 13.50c. and consumers are apparently prepared to restock at this level.

TIN.—A decree nationalizing the Patino, Hochschild and Aramayo tin groups is being signed to-day at Catavi by the Bolivian President and by Vice-President Siles. As might be expected this action has been prefaced by accusations of sabotage against the companies concerned. As this "sabotage" appears to have taken the form of cutting down on development work and restricting purchases of spares and equipment it is hardly surprising if the companies did act in this manner with the prospect of nationalization staring them in the face. We have seen enough of nationalization measures in recent years not to be over sanguine as to the effect of this latest exercise in the art on supplies of concentrates from Bolivia. Meanwhile smelters both here and in the States can only hope for the best.

ZINC.—The announcement, reported here last week, that zinc trading is to return to private hands on January 1 has not helped to stimulate the market in zinc. The American producers who tried to hold the price at 13.50c. had to admit defeat and the price fell to 12.50c. This decline caused the Ministry of Materials to reduce its price by £8 per ton to £110. But this adjustment is not likely to cause a surge in buying, for the latest British price is well above the current Continental quotation of around £90, and it is thought that when the market reopens, zinc prices will be roughly similar to those of lead. In New York, zinc has been changing hands at down to 12c. and this fact, coupled with the prospect of London dealings recommencing will tend to make buyers there postpone purchases as much as possible. The best that zinc producers can expect at present prices is two months of quiet trading, alleviated only when consumers' stocks have fallen below the irreducible minimum.

ALUMINIUM.—Britain will lend America in December 10,000 tonnes of aluminium and a similar quantity in the first quarter of 1953. These quantities are in addition to 25,000 tonnes of aluminium which was diverted by agreement in November, 1951 and January, 1952. The total amount of aluminium which Britain will have lent to America by next spring will thus be 45,000 tonnes. The loans to America are of aluminium which was due to be delivered to Britain under her contract with the Aluminum Co. of Canada. The quantities involved are being diverted to the United States and are to be repaid by U.S. deliveries to Britain by the end of 1955. Though the burden of these loans to America will fall on stocks here, Britain will, it is understood, still have adequate supplies for all the industries using aluminium. If for any reason Britain ran into difficulties, she would have the right to earlier replacement by America. The diversions from Canada to the United States will mean a temporary saving of 11,000,000 or 12,000,000 dollars on Britain's balance of payments.

BERYLLIUM.—In an effort to raise United States production of beryllium, the General Services Administration has announced that it has set up three purchase depots to buy domestic supplies of beryl ore from small producers. The domestic buying programme has the goal of 1,500 s.dry tons of ore. The U.S. generally purchases 90 per cent of its beryllium requirements from foreign countries. The General Services Administration will pay a flat price of 20c. per lb. or $400 a ton with payments increasing for higher grades of ore.

NICKEL.—D.M.P.A. announces it has signed an agreement with Milnet Mines Ltd., of Toronto, Canada, to buy 4,104,000 lb. of nickel. Under the agreement, Falconbridge Nickel Mines would buy the ore from Milnet and process it at its facilities at Falconbridge, Ontario, and Kristiansand, Norway.

Milnet Mines would start mining the ore from its properties in the Sudbury district of Ontaria not later than March 1, 1953.

QUICKSILVER.—The sharp increase in the Indian price of quicksilver reported here last week following the announcement that the Indian Government was to allow the export of 10,000 flasks of 76 lb. each has led to the growth of consumer resistance in the U.S. The difference of opinion concerning the right price is not very large, the Indian price, including export duty, being £55 10s. per flask f.o.b. whereas the U.S. is reported to be unwilling to pay more than £54 7s. 6d.

TUNGSTEN.—After to-day, the Ministry of Materials selling price for tungsten ores of standard 65 per cent grade and ordinary quality will be: wolframite 432s. 6d. and scheelite 422s. 6d. per ton unit delivered consumer's works.

GOLD.—The gold output of the Union of South Africa in September was 992,111 f.oz. (Transvaal 971,185, O.F.S. 20,926), compared with 997,099 f.oz. in August, and 951,980 f.oz. a year ago. Production in Colombia in July was 36,126 f.oz., which brings the output for the first seven months to 269,187 f.oz., compared with 257,978 f.oz. for the same period of last year. The increase is entirely in placer gold.

The London Metal Market

(From Our Metal Exchange Correspondent)

Tin has continued a dull and uninteresting market with prices tending to sag. Consumer demand both here and on the Continent has been slight. In the East the market has followed a similar course to that in London. Stocks of tin on warrant are again declining and the backwardation has widened somewhat.

The Eastern price on Thursday morning was equivalent to £959 15s. c.i.f. Europe. On Thursday the market was steady quiet.

Lead experienced a sharp rise on Monday morning on what appeared to be supporting orders, but the advance was not maintained and the market has since dropped back again. There was some demand for current month lead early this week which established a backwardation of £1 per ton, but the demand was soon satisfied and the backwardation has virtually disappeared. A reduction has taken place in the American price as we anticipated in last week's report, and their price now stands at 13½c. per lb. American consumers seem to be adopting a cautious attitude, and fears are expressed in the United States that if the decline in the London price continues it will eventually have the effect of curtailing production, particularly in America. On Thursday the market was firm quiet.

It was announced in London on Friday that the Government intend to hand over dealings in zinc to private trading, and that the expected date of commencement of free dealings will be January 1, 1953. A further announcement will be made as to this. The Government will cease to trade in zinc from the date decided upon in so far as necessary to round off its trading operations. In the meantime consumers can be expected to hold off the market and to cover only their immediate needs.

Copper is a quiet market this side of the Atlantic, but it seems to be anticipated that America will continue to be a buyer of the high-priced Chilean metal, at any rate for the rest of this year.

CLOSING PRICES AND WEEK'S TURNOVER

	October 23		October 30	
	Buyers	*Sellers*	*Buyers*	*Sellers*
Tin				
Cash	£951 10s.	£952 10s.	£963	£965
Three months	£941 10s.	£942 10s.	£944	£946
Settlement	£952		£964	
Week's turnover	340 tons		370 tons	
Lead				
Current month	£82 15s.	£83 0s.	£86 15s.	£87
Three months	£82 10s.	£82 15s.	£86 5s.	£86 10s.
Week's turnover	6,350 tons		5,700 tons	

Iron and Steel

The end of the steel shortage is in sight. Production is moving up to record heights, imported material exceeds last year's tonnage by 1,200,000 tons and stocks are increasing. The Ministry of Supply cannot be accused of undue haste in translating increased supplies into more generous allocations, but this week the motor industry has been promised additional steel during the final quarter of this year. Shipbuilders have had their allocations increased by 8 per cent and are to receive an additional 9 per cent next quarter. Steel allocations for the railway workshops are to be on a more generous scale after January 1 and more steel is to be released for factory building. A further concession announced by the Ministry abolishes the distinction hitherto drawn in the allocation of alloy and non-alloy steels.

On and after January 1 consumers will be offered free choice of quality with the reservation that tinplate, terneplate and blackplate, for which there is an overwhelming demand, will remain separately allocated as at present. Quite clearly the time is approaching when the rationing system will no longer be necessary and complete freedom of distribution restored.

A few months ago the stoppage of German scrap exports would have dismayed British steel makers, but they are now in a much better position to withstand the shock. Scrap imports from other overseas sources are on a better scale than last year. Home deliveries in the first nine months of this year are up to 150,000 tons, and the works moreover are less dependent on scrap supplies since pig iron production is running at the rate of 1,000,000 tons per annum above last year.

OCTOBER 30 PRICES

COPPER

Electrolytic ... ... £285 0 0 d/d

LEAD AND TIN

(See our London Metal Exchange report for Thursday's prices)

ZINC

G.O.B. spelter, foreign, duty paid ... £110 0 0 d/d
G.O.B. spelter, domestic... ... ... £110 0 0 d/d
Electrolytic and refined zinc ... ... £114 0 0 d/d
Special high grade ... ... £116 0 0 d/d

ANTIMONY

English (99%) delivered, 10 cwt. and over ... ... £225 per ton
Crude (70%) ... ... £210 per ton
Ore (60% basis) ... ... 20s. — 22s. nom. per unit, c.i.f.

NICKEL

99.5% (home trade) ... ... £454 per ton

OTHER METALS

Aluminium, £166 per ton.
Bismuth, 17s. lb. (min. 2 cwt. ex-warehouse).
Cadmium, (Empire) 14s. 4d. lb.
Chromium, 6s. 3d./6s. 7d. lb.
Cobalt, 20s. lb.
Gold, 248s. f.oz.
Iridium, £60 oz. nom.
Magnesium, 2s. 10½d. lb.
Manganese Metal (96%-98%) 2s. 2d./2s. 3d. per lb. d/d
Osmiridium, £40 oz. nom.
Osmium, £65/£70 oz. nom.
Palladium, £715s./£810s. oz.
Platinum, £27/£33 5s.
Rhodium, £42 10s. oz.
Ruthenium, £25 oz.
Quicksilver, £64 10s. ex-warehouse
Selenium, 25s. nom. per lb.
Silver 73d. f.oz. spot and f'd.
Tellurium, 18s./19s. lb.

ORES, ALLOYS, ETC.

Bismuth ... ... 60% 9s. 6d. lb. c.i.f.
50% 8s. 6d. lb. c.i.f.

Chrome Ore—
Rhodesian Metallurgical (lumpy) £14 2s. per ton c.i.f.
" (concentrates) £14 2s. per ton c.i.f.
" Refractory £13 14s. per ton c.i.f.
Baluchistan Metallurgical ... £15 8s. per ton c.i.f.
Magnesite, ground calcined ... £26 - £27 d/d
Magnesite, Raw ... ... £10 - £11 d/d
Molybdenite (85% basis) ... 105s. 10d. per unit c.i.f.
Wolfram (65%) ... ... 410s. c.i.f. U.K. buying
" " ... ... 447s. 6d. d/d U.K. selling
Scheelite ... ... 400s.
Tungsten Metal Powder (for steel manufacture) ... 31s. 7d. nom. per lb. (home)
Ferro-tungsten ... ... 28s. 7d. nom. per lb. (home)
Carbide, 4-cwt. lots ... ... £32 3s. 9d. d/d per ton
Ferro-manganese, home ... £49 0s. 8d. per ton
Manganese Ore U.K. (48% - 50%) ... ... 6s. per unit
Brass Wire ... ... 2s. 8½d. per lb. basis.
Brass Tubes, solid drawn ... 2s. 3d. per lb. basis.

THE MINING MARKETS

(By Our Stock Exchange Correspondent)

Stock markets were again very quiet. Trading conditions remained stagnant and gilt-edged stocks, which began the week in a rather better frame of mind, eased off towards the end. The increased budgetary deficit for the year to date and the high rate of government spending had a dampening effect on the market. Transferable sterling touched $2.71, the highest level for a long time past. This was partly the result of continental dealings in base metals with cheap sterling. The British deficit with some continental countries may consequently be sharply reduced.

Rand shares and finance houses were quiet but the undertone was better. Good quarterly returns from Consolidated Goldfields and Central Mining received less attention than their due owing to racial troubles in various parts of Africa, such buying interest as there was being mainly confined to uranium issues. Premium sales for the quarter again showed an all round decline. Doornfontein shares eased on the lower development values and the better results from the Durban Deep and West Driefontein remained unrecognized. Blyvoors again returned 100 per cent payability. One of the main buildings at the City Deep mine was destroyed by fire on October 24.

The O.F.S. market was featureless but steadier. Union Free State Coal and Gold shares fluctuated considerably on rumour and counter-rumour. In some quarters it is thought that the company might distribute its big holding in Harmony Gold. At current market values this works out at about 7s. 6d. per U.F.S.C. & G. share compared with the present market price of 6s. 6d. The company is having difficulties with its Raleigh colliery and a substantial loss has been incurred. The Anglo American Corporation are raising another £12,500,000 for Welkom, President Brand and President Steyn. The company is raising this by diverse means, but it is clear that a direct appeal to shareholders is being minimized as much as possible. The fact that the field has already swallowed a lot of capital and the disturbing influence of South African politics has rendered this a very difficult question.

Tin shares, particularly those in the Eastern group, were marked better. Recent quarterly returns from dredging companies have been satisfactory, Malayan Dredging being particularly impressive with a rise of 1,121 tons over the comparable nine months of the preceding year. The market price of the metal still remains at an economic level. Beralts recovered somewhat from last week's loss, but buyers are definitely cautious at to-day's price.

The behaviour of tin is in direct contradiction to lead and zinc. Free dealings in zinc will be resumed as from January 1 next. Readers will recall that this column has anticipated some such action in recent weeks. The current free price of zinc, in easy supply on the continent, is around £90 a ton. This compares with the U.K. selling price of £110 a ton, after a cut of £8 during the week. It seems probable that the level may go lower once dealings are freed.

There has been considerable discussion in the market concerning the current working costs of some of the large Australian producers. It is thought that these may now be fairly close to the metal price but it is difficult to assess as many mines operating a sliding scale of wages based on the price of the metal. This should mean some considerable reduction in wage costs, provided strike action does not hamstring production. We must await the freeing of the market before any accurate assessment can be made. Lead/zinc shares were uneasy in consequence and were marked down.

Coppers all fell on the continuance of the Rhodesian strike which shows no sign as yet of being settled. The Messina final dividend of 220 per cent, however, had a somewhat cheering effect as it was well above most market estimates. Mount Lyell reported an increase of copper output from 6,900 to 9,048 tons during the year ending September 30.

	Price Oct. 29	+ or − on week
FINANCE		
African & European	2½	−⅛
Anglo American Corpn.	5⅜	−⅛
Anglo-French	18/6	−10½d
Anglo Transvaal Consol.	25/-	−7½d
Central Mining (£1 shrs.)	31/10½	
Consolidated Goldfields	42/6	
Consol. Mines Selection	24/4½	
East Rand Consols	2/4½	
General Mining	3⅛	−⅛
H.E. Prop.	30/-	−7½d
Henderson's Transvaal	8/9	−6d
Johnnies	46/3	7½d
Rand Mines	3¼	−⅛
Rand Selection	35/7½	
Strathmore Consol.	26/3	
Union Corp. (2/6 units)	30/3	
Vereeniging Estates	3¼	−⅛
Wits	28/9	−7½d
West Wits	40/-	−7½d
RAND GOLD		
Blyvoors	41/-	+3d
Brakpan	15/6	−3d
City Deep	28/1½	
Consol. Main Reef	30/7½	+7½d
Crown	38/9	+2/6
Daggas	3⅜	+⅛
Doornfontein	23/1½	−4½d
Durban Deep	2⅜	−⅛
E. Daggas	17/6	
E. Geduld (4/- units)	39/4½	
E. Rand Props.	3⅛	
Geduld	5¼	
Govt. Areas	12/-	
Grootvlei	26/10½	
Libanon	11/1½	−3d
Luipaards Vlei	20/6	
Marievale	19/6	−3d
Modderfontein East	21/3	
New Kleinfontein	25/7½	−7½d
New Pioneer	12/9	−6d
Randfontein	23/-	−3d
Robinson Deep	10/3	+3d
Rose Deep	32/6	
Simmer & Jack	5/4½	+1½d
S.A. Lands	35/7½	+7½d
Springs	6/6	
Stilfontein	22/3	−3d
Sub Nigel	42/6	+1/3
Van Dyk	11/9	
Venterspost	16/9	+1½d
Vlakfontein	16/3	
Vogelstruisbult	28/9	+9d
West Driefontein	5⅛	−⅛
W. Rand Consolidated	50/-	−7½d
Western Reefs	43/1½	−7½d
O.F.S.		
Freddies	7/-	
Freddies N.	8/3	+1½d
Freddies S.	7/3	+1½d
F.S. Geduld	2⅜	−⅛
Geoffries	15/6	−6d
Harmony	19/3	−6d
Loraine	6/3	−4½d
Lydenburg Estates	9/4½	−7½d
Merriespruit	3/9	−3d
Middle Wits	14/6	−3d
Orkits	38/1½	
President Brand	18/9	−9d
President Steyn	17/-	−6d
St. Helena	15/-	
U.F.S.C. & G.	6/7½	+3d
Virginia Ord.	12/1½	−4½d
Welkom	20/6	+6d
Western Holdings	3⅛	−⅛
WEST AFRICAN GOLD		
Amalgamated Banket	1/6	
Ariston	5/9	−1½d
Ashanti	16/6	
Bibiani	5/7½	−1½d
Bremang	2/3	
G.C. Main Reef	3/6	
G.C. Selection Trust	6/-	−3d
Konongo	2/1½	−1½d
Lyndhurst Deep	1/-	
Marlu	1/4½	
Taquah & Abosso	2/6	
AUSTRALIAN GOLD		
Boulder Perseverance	2/-	
Gold Mines of Kalgoorlie	9/7½	−4½d
Great Boulder Prop.	5/-	−3d
Lake View and Star	16/4½	−1½d
Mount Morgan	17/1½	−7½d
North Kalgurli	12/-	+1½d
Sons of Gwalia	7/-	
South Kalgurli	7/3	
Western Mining	9/3	−3d
MISCELLANEOUS GOLD		
Cam and Motor	41/3	−7½d
Champion Reef	6/3	+6d
Falcon Mines	8/6	−3d
Globe & Phoenix	25/-	
G.F. Rhodesian	6/-	
London & Rhodesian	4/9	−1½d
Motapa	1/9	
Mysore	3/3	+3d
Sundvidroog	4/9	
Ooregum	2/6	
Oroville	11/-	−3d
MISCELLANEOUS GOLD (contd.)		
St. John d'El Rey	24/-	−1/-
Zams	33/9	−1/-
DIAMONDS & PLATINUM		
Anglo American Inv.	4½	−⅛
Casts	26/6	+3d
Cons. Diam. of S.W.A.	4	−¼
De Beers Defd. Bearer	60/9	−1/-
De Beers Pfd. Bearer	13¾	
Pots Platinum	8/10½	−1½d
Watervaal	14/4½	−7½d
COPPER		
Chartered	55/-xd	−1/3
Esperanza	3/10½	
Indian Copper	4/9	
Mesina	4¼	−⅛
Nchanga	6⅝	−⅛
Rhod. Anglo-American	54/6xd	−3/9
Rhod. Katanga	14/-	−3d
Rhodesian Selection	16/4½	−10½d
Rhokana	19½xd	−1½
Rio Tinto	23	−1
Roan Antelope	13/8	+1½d
Selection Trust	38/9	−2/-
Tanks	60/-	−9d
Tharsis Sulphur Br.	42/6	−2/6
TIN (Eastern)		
Ayer Hitam	24/6	
Bangrin	8/-	+3d
Gopeng	10/9	−3d
Hongkong	7/6	
Ipoh	21/3	−7½d
Kamunting	10/9	−3d
Kepong Dredging	7/6	
Kinta Tin Mines	12/3	+6d
Malavan Dredging	23/6	+6d
Pahang	15/3xd	−1/3
Pengkalen	10/9	+6d
Petaling	14/6	+1½d
Rambutan	12/6	−6d
Siamese Tin	21/7½	+4½d
Southern Kinta	14/9	
S. Malavan	26/-	+6d
S. Tronoh	12/9	+3d
Sungei Kinta	18/9	
Tekka Taiping	7/9	
Tronoh	23/-	+6d
TIN (Nigerian and Miscellaneous)		
Amalgamated Tin	10/3	−4½d
Beralt Tin	30/3	+1/1½
Bisichi	4/6	
British Tin Inv.	14/9	
Ex-Lands Nigeria	4/9	−5d
TIN (Nigerian and Miscellaneous) contd.		
Geevor Tin	13/9	
Gold & Base Metal	3/6	−1½d
Jantar Nigeria	11/3	+4½d
Jos Tin Area	10/3	+3d
Kaduna Prospectors	4/-	
Kaduna Syndicate	4/6	+3d
London Tin	5/3	
United Tin	2/9	
SILVER, LEAD, ZINC		
Broken Hill South	44/4½xd	−2/6
Burma Corporation	1/7½	
Consol. Zinc	25/-	−3d
Lake George	12/9	+3d
Mount Isa	33/-	−1/3
New Broken Hill	22/6	
North Broken Hill	51/3	−7½d
Rhodesian Broken Hill	14/1½	−1½d
San Francisco Mines	25/3	−6d
Uruwira	3/10½	−1½d
MISCELLANEOUS BASE METALS & COALS		
Amal. Collieries of S.A.	47/-	−6d
Associated Manganese	36/-	−2/6
Cape Asbestos	17/9	−7½d
C.P. Manganese	49/6	+7½d
Consol. Murchison	27/-	+9d
Mashaba	8d	
Natal Navigation	3⅛	−⅛
Rhod. Montelco	12/3	−3d
Turner & Newall	93/3	−1/9
Wankie	16/4½	−4½d
Witbank Colliery	50/-	
CANADIAN MINES		
Dome	$34½	−$3
Hollinger	$29	−$1¼
Hudson Bay Mining	$102	−$9
International Nickel	$80½	−$2
Mining Corpn. of Canada	£5¼	−£¼
Noranda	$151	−$1
Quemont	£6½	
Yukon	4/-xd	−1½d
OIL		
Anglo-Iranian	5⅞	−⅛
Apex	41/10½	−1/3
Attock	23/1½	
Burmah	43/1½xd	−1/3
Canadian Eagle	35/3	+4½d
Mexican Eagle	23/6	−4½d
Shell (bearer)	4	−¼
Trinidad Leasehold	29/6	−1/-
T.P.D.	25/7½	
Ultramar	28/6	−1/3

RAND AND O.F.S. QUARTERLY REPORTS

Several points of interest emerged from the Kaffir September quarterly reports, while the progress made in the Orange Free State enabled a clearer picture to be discerned.

Working profits were up in the case of about half the mines; the remainder being down on those of the previous quarter. Only in the case of very few mines was the amount receivable in respect of gold premium above the mid-year three monthly figure. The result was that during the third quarter of the current year, the amount received as additional revenue from sales of gold for industrial and artistic purposes was, according to the Transvaal Chamber of Mines, £787,232, compared with £1,004,616 in the second quarter when variations in official gold prices for the first half of the year were included, and £1,216,334 in the March quarter.

The footage of development, so far as can be judged, did not show a consistent trend either with the individual mines of the various groups, or as a whole. More work was done on about half the mines, with both pay ratio and values varying.

Working costs on some of the mines were very similar to those of the previous three months, but on a number the emphasis was on an upward trend.

ORANGE FREE STATE MINING WORK

Reef footage and work generally in the O.F.S. was on a higher level than in the previous quarter.

In the Anglo American group, Free State Geduld, which announced flooding of the No. 2 shaft in mid-September, mentioned that de-watering of the shaft had started. It is intended to recover the shaft by large-scale pumping.

A big jump in reef footage was registered by Western Holdings though results were rather lower. Of the 10,793 ft. developed, 1,280 ft. sampled on Basal reef gave payability of 91 (against 93) per cent and value, 782 compared with 859 in.-dwt. The reduction plant started up for test purposes on July 4 and operated satisfactorily on small tonnages of development rock. Construction of the original 50,000 tons per month section has been completed and work started on the extension to 75,000 tons.

At Welkom, output and development were adversely affected by difficulties resulting from inrush of water in a section of the No. 1 shaft area, which was reported at the end of July.

Further development results announced by President Steyn showed that of the 440 ft. sampled on Basal reef, 73 per cent was payable, averaging 437 in.-dwt. No work was done on the reef in the previous quarter. Small initial footage was started in the March three months. President Brand reported progress of shaft sinking and confirmed drilling results secured in connection with underground work. Loraine confirmed that the Basal reef was intersected in No. 1 shaft at 4,805 ft.

Both Freddies South and Freddies North (Johnnies group) stated that their reduction plants will be completed before the end of the year. The latter company reported high values for short stretches of reef sampled, particularly from No. 2 shaft—18 sections over a distance of 85 ft. from the south return airway gave 32.8 dwt. over 26 in. or 853 in.-dwt. In No. 1 shaft area sampling of 185 ft. of development averaged 14.8 dwt. over 25 in. or 370 in. dwt. At Freddies South 70 ft. of driving on the Basal reef in the No. 2 shaft area averaged 17.6 dwt. over a channel width of 26 in., equal to 457 in. dwt. The restricted drilling disclosed in Free State Development ("Freddies") annual report was again manifest in the September quarterly report. The company stated that no new boreholes were started during the September three months.

Further improvement in reef payability was reported by St. Helena (Union Corp.). Of Basal reef sampled, 4,055 ft. or 46 per cent was payable against 3,020 ft. or 38 per cent in the June quarter. Average values of 14.6 dwt. over 20 in., equal to 292 in. dwt. were compared with 328 in. dwt.

Better gold reef developments were shown by Virginia (Anglo Transvaal). Payability was 71 per cent and values averaged 321 in. dwt., compared with 47 per cent and 284 in. dwt. in the June quarter. A greater proportionate footage was done from the deepest shaft (No. 1), which has so far been giving the best results. Merriespruit is making progress and No. 1 shaft is now down to 3,324 ft. Middle Witwatersrand announced further reef strikes from the drilling programme in the Klerksdorp Townslands, but none gave payable values.

Although a total of 438 ft. was developed on Harmony (Central Mining), no reef values were announced. The Ventilation shaft was sunk to a depth of 4,587 ft. and the No. 3 shaft to 3,954 ft. It is expected that the Basal reef will be encountered in this shaft at 4,820 ft.

No new borehole results were announced by "Geoffries" (General Mining). The Rosedale drill was reported to be down 6,455 ft. and that on Spes Bona, 5,189 ft. at end of quarter.

RAND PRODUCERS RESULTS

Central Mining—Rand Mines Group.—Although a lower development footage was accomplished by the majority of the Central Mining members, some exceptionally good values and payability were disclosed.

A return to the full 100 per cent payability was announced by Blyvoor with values of 557 against 499 in. dwt. in the previous quarter when the pay ratio was 97 per cent.

Both values and payability on Crown Mines showed to advantage. Of the 14,000 ft. sampled, the pay ratio rose to 60 against 48 per cent and value 369 in. dwt. against 283. These results were the best for a very long time. City Deep did not do so well and of the 5,650 ft. sampled, 31 (against 35) per cent was payable with value of 275 compared with 343 in. dwt.

Consolidated Main Reef's payability of 39 per cent was down but the value came out at 303 against 250 in. dwt. At Durban Deep payability last quarter was 80 per cent of the 12,090 reef footage sampled, compared with 59 in the previous quarter, and average values recovered to 346 from 294 in. dwt. There was little change in East Rand Proprietary's payability of 71 per cent but values of 398 compared with 344 in. dwt. previously.

Of the 2,765 ft. sampled on Modder East, 16 against 20 per cent was payable, value being down to 174 in. dwt. (204). There was not much variation in the pay percentage of the lower footage sampled at Rose Deep; the pay ratio was 36 per cent and value 322 in. dwt. Transvaal Gold's return was satisfactory but Welgedacht made a bad showing with payabiilty down at 27 against 53 per cent, with values of 115 (114) in. dwt.

Anglo American Corporation.—Most of the mines under the aegis of the Anglo American Corporation did less development than in the mid-summer three months and footage sampled was lower. The pay ratio of six was better and values in some cases well in advance of those previously announced.

Brakpan's payability was better at 29 per cent, while the value of the 12,820 ft. sampled rose to 673 in. dwt. (against 474 in. dwt.). Kimberley reef value and pay percentage of Daggafontein were well in advance of the June quarter. Of the 6,260 ft. sampled, 49 (against 41) per cent was payable, value 570 in. dwt. (459). Pay ratio of the 5,620 ft. sampled on the Main Reef leader went up to 52 compared with 44 per cent, value being 281 (288) in. dwt. This same reef on East Daggafontein gave payability of 32 (compared with 28) per cent, and value 209 as against 196 in. dwt. in the previous quarter.

South African Land's pay ratio was 35 against 42 per cent, of the 11,505 ft. sampled, value coming out at 444 compared with 403 in. dwt. An additional footage of sampling took place on Springs Mines—7,865 against 7,715 ft., payability being 39 (31) per cent, and value of 327 compared with 292 in. dwt.

A drop was again registered in Western Reefs payability and value. More development was done—20,857 ft.—and the footage sampled of 9,800 ft. went against 9,160 ft., but pay ratio dropped to 41 per cent against the two previous quarterly figures of 43 and 45 per cent. Value was 348 in. dwt. against 374.

Contrary to expectations, all the development footage last quarter at Vaal Reefs property (adjoining Western Reefs) was in country rock. Equipment of the No. 3 shaft (sunk jointly with Western Reefs) is completed.

Consolidated Gold Fields.—All, with the exception of two mines of the Gold Fields producers, did a rather larger amount of development last quarter, with pay ratios and values well up to the measure of those of the previous quarter.

West Driefontein again announced 100 per cent reef payability of all the 2,230 ft. sampled, with an average value of 15.1 dwt. of gold per ton over an estimated stoping width of 45 in., equivalent to 680 in. dwt. This compares with 693 in. dwt. for the whole year to last June when 100 per cent payability was maintained throughout.

Development at Doornfontein showed lower values and pay ratio than in the previous quarter when the task of opening up the reef from the Annan shaft in the eastern part of the mine adjacent to Blyvoor Gold was resumed. Of 520 ft. of reef sampled, 75 per cent was payable averaging 6.8 dwt. over a stope width of 45 in., equal to 306 in. dwt. In the mid-year quarter the whole of 265 ft. of reef sampled was payable with an average value of 446 in. dwt.

Libanon's payability was 63 against 55 per cent though value was down at 289 in. dwt. The other Far Western Rand member, Venterspost, sampled 11,045 ft. with little variation in results from those of the previous three months.

Of the older mines, improved payability and value was announced by Simmer—44 per cent with value 367 in. dwt. Robinson Deep's value was 383 in. dwt. with pay ratio of 52 per cent. Sub Nigel's payability of 33 per cent was similar to the June quarter but both pay ratio and value were higher in the case of Vogelstruisbult. Vlakfontein's value was slightly down.

An echo of Luipaards Vlei's entry into the list of uranium producers was given by the statement that 5,659 ft. of the total footage of 18,080 had been carried out to explore the Bird reefs, so important as uranium carriers.

Union Corporation.—Summary of developments of the mines belonging to Union Corporation showed differences from the June results in both payable footage and value.

East Geduld's main reef pay ratio was down to 40 against 52 per cent but value was rather better—190 against 145 in. dwt. Geduld's payability of 21 per cent was the same as in the previous quarter but footage sampled was substantially more—3,530 against 2,815 ft., while the value was 214 against 201 in. dwt.

Both pay ratio and value of Grootvlei were down. Of the 13,033 ft. developed, 9,990 ft. were sampled, payability being 46 against 55 per cent and value 176 compared with 220 in. dwt.

More work was done by Marievale both on the Main and Kimberley reefs. Of the 6,367 ft. of development done on the former, 4,165 ft. were sampled and 36 against 49 per cent was payable, with value of 367 (314) in. dwt. Both pay ratio and value of the Kimberley reef were lower; of the 1,785 ft. sampled, 17 (against 20) per cent was payable, giving a value of 177 compared with 200 in. dwt.

Of the 6,540 ft. sampled by Van Dyk, 40 (against 35) per cent was payable, but the value was the same as previously, 232 in. dwt. Of the development undertaken in the southern area of the mine, 49 per cent of the footage sampled proved payable, with average values of 238 in. dwt. The September quarterly payability was the best reported to date in the area being opened up from the new No. 5 shaft.

"Johnnies" Group.—Steady progress was made by the five old mines belonging to Johannesburg Consolidated. The footage sampled compared favourably with that of the previous quarter, while both payability and values were satisfactory.

Government Areas is to erect a pyrite recovery plant at an estimated cost of £125,000. Of the 6,015 ft. sampled last quarter, 63 per cent proved payable, giving a value of 216 against 245 in. dwt.

A much larger footage was sampled by East Champ d'Or—865 against 575 ft., 61 per cent of which was payable, while value was slightly better than that previously—202 compared with 189 in. dwt.

New State Areas again worked at a loss (£1,985 against £2,400) but premium gold brought in £4,437 compared with £6,995. Footage sampled was lower at 1,697 ft., payability being 22 per cent and value 238 (223) in. dwt.

The footage sampled by Randfontein was very much the same as in the previous three months—9,070 against 9,085 ft.—with payability of 43 (against 33) per cent and value of 295 (compared with 302) in. dwt. Profit of £71,802 was almost exactly the same as in the June three months but sales of gold at enhanced prices brought in only £33,121 compared with £44,030. The company reported expenditure to date of £211,361 on the uranium project which will be met from loan funds.

The remaining member of the group—Wit Gold—sampled 990 ft. of which 16 per cent was payable of a value of 159 in. dwt. The small profit of £1,449 was added to by £5,530 (£8,069) from premium sales.

General Mining.—Footage of development work on West Rand's six reefs amounted to 22,618 ft., and of the 8,475 ft. sampled, 47 per cent proved payable, value being 260 in. dwt. compared with 281 in. dwt. the previous quarter, when the pay ratio was 55 per cent. The company's West gold reduction plant came into production in September and 16,000 tons were milled in that month. The uranium plant was officially started up on October 8.

The other member, South Roodepoort, sampled 5,350 ft. for a pay ratio of 32.5 per cent and value 256 in. dwt. Both were below the previous quarter.

Anglo Transvaal.—Rand Leases reported that reef development gave payability of 53 per cent (against 58) from the increased footage sampled of 12,360, and pay values averaged 252 in. dwt. compared with 247 in. dwt. in the June quarter.

Strathmore.—Better developments were reported by Stilfontein. Of 2,430 ft. of Vaal reef sampled, 91 per cent was payable, averaging 45.8 dwt. gold per ton over 5.7 in. or 261 in. dwt. The first quarter's production which started on July 1, produced a working profit of £5,518.

Independent.—Footage development done by New Kleinfontein was 10,969, of which 6,605 ft. were sampled, payability being 53 per cent and value 193 in. dwt.

Wit Nigel's September quarterly showed that the better developments previously reported were fully maintained and of the 3,205 ft. sampled, payability was 41 per cent, value 230 in. dwt.

Obituaries

J. G. LAWN

The death is reported from Zululand, whither he had retired, of Professor J. G. Lawn, so long closely associated with the Johannesburg Consolidated Investment Co. Professor Lawn was 84 years of age when he died.

Professor Lawn was born in Lancashire, and after leaving school he went to the mines for some years before entering the Royal School of Mines, where he won several prizes and received his Associateship in 1891. After leaving the school he became surveyor and engineer at the mines of the Barrow Haematite Steel Co. and was appointed mine surveying instructor to the Royal School of Mines in 1893. In 1893 he went to South Africa where, for four years, he was assistant consultant engineer to "Johnnies." In 1896 he was appointed Professor of Mining at the Kimberley School of Mines, which was subsequently transferred to Johannesburg and later incorporated with the Witwatersrand University, where Professor Lawn ultimately became Principal, and Professor of Mining. Later he returned to England and was from 1907-1909 head of the Mining Department of the Camborne School of Mines and at the end of that time he resumed his professorship at Johannesburg and was promoted consulting engineer at the Johannesburg Consolidated Investment Co.

After the first world war, in which he filled various positions in the Ministry of Munitions, he became Johannesburg Joint-Managing Director of "Johnnies," subsequently being transferred to London where he worked as their consulting engineer in England for many years until his retirement. He was created C.B.E. in 1920, and was President of the Institution of Mining and Metallurgy in 1930.

HANS MERENSKY

Dr. Hans Merensky, the famous South African geologist, died in South Africa last week at the age of 81. His name is associated particularly with the study of diamondiferous gravels of South-West Africa and Namaqualand, in which he was associated with Dr. P. A. Wagner. He also investigated the Norite and Dunite formations of the bushveldt in the Northern Transvaal where the main horizon was called after him the Merensky horizon. He wrote at large on problems of South African geology.

J. H. G. BANKS

Mr. John Banks, one of the three brothers so long associated with gold mining in the Waihi district, and a local director of the Martha, died earlier in the month. He had been associated with the Waihi mine for over 50 years, and was for many years battery superintendent at Waikino. As the Waihi Co. was formed in 1887 he had been connected with it for almost the whole of its life.

COMPANY NEWS AND VIEWS

West Driefontein as a Gold Producer

West Driefontein Gold Mine commenced a new chapter as a gold producer this year and, after trial runs during January, milling started on February 1. Mr. Annan, the Gold Fields chairman, poured the first bar of gold. The annual report for the twelve-months ended June 30 shows that income for seven months to January 31 was £19,515 and general charges, etc., £127,943, making net expenditure to that date, £513,062. The profit and loss account for the five months to June 30 discloses a profit with sundry income of £260,581. After deducting expenditure there is a balance of £250,614, which is placed to general reserve. It was found necessary to seek loan facilities of £150,000 and a further £105,000 has been borrowed since the closing of the accounts.

The mine's milling results have shown satisfactory increases with grade of ore stepped up and profits expanding. Tonnage milled for the five months period to June 30 was 115,000 tons, the yield of gold being 49,193 oz. or 8.55 dwt. per ton. Revenue, including gold sold at enhanced prices amounted to 109s. 3d. per ton and working costs 66s. At the start they were 69s. and have gradually trended downwards. Working profit per ton was 43s. 3d. and the total £249,049. Taking into consideration the usual difficulties attendant upon the starting up of a new plant and the absorption of gold during the initial period, the results obtained may be regarded as very satisfactory.

Total development footage advanced during the year amounted to 18,314 ft., 10,690 ft. being sampled—all of which proved payable averaging 15.4 dwt. over a stoping width of 45 in., equivalent to 693 in.-dwt. During the year a holing was effected between Nos. 1 and 2 shafts on 10th level horizon. In addition to the completion of the first two units of the reduction plant, construction work on the third unit is proceeding satisfactorily and consolidation of ground for the fourth unit has commenced.

Doornfontein's Progress

The property of Doornfontein Gold adjoins Blyvoor's western boundary and in claim area is nearly double the size of its rich neighbour. Most of the work done has been directed to sinking the No. 1 and the Annan shafts. Some development took place from this latter but was suspended in June, 1951, in order to facilitate the sinking of the shaft to its final depth of 4,736 ft. This has now been done and its equipment was almost complete at the end of the financial year in June last. The June quarterly stated that development had been resumed and the annual report to June 30, 1952, now confirms that operations were resumed in May, 1952. The footage on reef and sampled amounted to 265 ft., all of which proved payable, at an average value of 9.9 dwt. per ton over a stoping width of 45 inches. Operations at No. 1 shaft, which had been suspended, were resumed during July 1951, and the depth is now 2,823 ft.

The mine manager reports that during the year a total of 1,298 ft. of development was accomplished on the 4th, 5th and 6th levels at the Annan shaft, but the footage, for the most part, was off the reef on station layout development and crosscutting to reef. Work has continued on the testing and consolidation of the ground upon which the reduction plant is to be situated. Foundations for various sections have been laid and work on the erection of some buildings commenced.

The accounts show that income from dwellings, deposit interest, etc., amounted to £33,129. General charges, etc., were £96,602 which increased the net expenditure to date to £228,235. The balance sheet shows fixed assets £3,864,768 including shaft sinking, development, etc., of £2,982,997. Floating assets are £211,674 and cash assets £2,778,541. It was in November of last year that the company made an issue of 2,808,000 shares at 23s., bringing the issued capital up to £4,914,000 in 10s. shares.

Better Development at Luipaards Vlei

The first unit of the extension to the Turk Shaft reduction plant at the Luipaards Vlei Estate was brought into commission during March, 1952, but the report to June 30 last does not give much indication of the benefit derived from this. Subsequent monthly outputs have, however, shown an expanding tendency.

The mill throughput last year at 1,189,000 tons was 26,000 tons lower. The yield was also lower, while working costs increased by 2s. 9d. per ton to 36s. 1d., due mainly to extra living allowances to Europeans, and the price of stores. Had it not been for this, the profit would have shown up better as the revenue per ton of 48s. 1d. was the same as previously. Profit per ton, however, dropped to 12s. against 14s. 9d. and the total working profit at £713,906 was £184,305 lower. As a consequence shareholders receive less and the 1s. per share dividend which had been paid each half year since June, 1949 has been reduced—the total paid being 1s. 3d. per share.

Mining work proved satisfactory. A slightly larger footage of development was done—60,105 ft. compared with 57,266 ft. but the footage sampled was lower at 28 800 ft. However, both payability and value showed up better than in the previous year; pay ratio coming out at 62 8 per cent and value, 6 5 dwt. (against 60 per cent and 5 8 dwt.), while stope width was 43 8 in. (45.2 in.). Compared with the previous year, ore reserves are down by 259,000 tons to 2,743,000 tons, value being higher at 4.4 dwt. Their computation is based on a pay limit calculated to conform approximately to existing conditions in respect of gold price and working costs. Development on the Montana Reef was continued and of the 1,650 ft. sampled, 520 ft. was payable with a value of 4 8 dwt. Underground work in connection with the exploration of the Bird Reef was also continued, but sampling results indicated low gold content. Operations were adversely affected by shortages of electric power and native labour.

West Africans in September

The September mine returns from six of the West African gold producers completes their financial year.

Of these six, only Ariston Gold and Marlu showed an increased profit over the previous year. Perhaps the most encouraging return was that from Taquah and Abosso, which recorded the lowest monthly loss for 12 months. Konongo nearly attained last year's aggregate profit figure but A.B.A., Ashanti, and Bibiani showed appreciable declines.

Company	September, 1952 Tons (000)	Yield (oz.)	Profit* (£000)	Months since year end	Current Financial Year Total to Date Tons (000)	Yield (oz.)	Profit* (£000)	Last Financial Year Total to Date Tons (000)	Yield (oz.)	Profit* (£000)
A.B.A.....	66	9,412	26.9	12	636	103,052	244	657	93,812	308
Ariston Gold	28	9,286	45.3	12	330	114,521	568	328	102,866	528
Ashanti Gold	22	15,000	80.7	12	227	166,890	831	237	190,745	1,067
Bibiani(1927)	31	6,019	16.2	12	361	70,775	170	352	74,306	197
Bremang‡ ..	606	3,527	23.7	9	5434	27,027	146	6358	30,380	162
G.C.M.R....	8	3,139	10.1	3	25	9,184	25	26	9,034	31
Konongo....	2	2,274	9.8	12	30	26,325	118	37	28,506	120
Marlu Gold..	41	4,122	10.1	12	477	45,206	101	471	42,338	84
Nanwa Gold	3	709	N/A	9	25	6,268	N/A	22	3,467	N/A
Taquah and Abosso.....	21	5,322	L 1.6	6	126	29,087	L 51	125	30,397	25

*Including premium revenue since November, 1951. As the basis of calculating monthly profit varies from company to company a direct comparison one with another is not possible. The basis for any one company has, however, remained consistent, unless otherwise indicated.

‡Ore treated given in cu. yd. L indicates a loss.

Gold Coast Main Reef continues to maintain its tonnage throughput and gold production but its profit figure for the first three months of the current year does not compare with the corresponding figure for the previous year.

"Indians" at the Half-Way Mark

The four Kolar Gold Fields producers' September returns show that the group continues to follow a consistent pattern. Champion Reef recorded the highest output since February last but the increase is more of interest for the record-book than for any substantial difference it will make to profits. Tonnage treated at Mysore was actually below the average of the first six months of the current year but the ounces recovered has only been bettered once in the last two years. The current year's total to date shows up well against the corresponding period

of the preceding year and if the gold price on the Bombay bullion market recovers its former strength the end year total profit figure should be impressive.

Company	September, 1952		Months Since Year End	Current Financial Year Total to Date		Last Financial Year Total to Date	
	Tons (000)	Yield (oz.)		Tons (000)	Yield (oz.)	Tons (000)	Yield (oz.)
Champion Reef	13	5,959	6	78	35,523	88	36,220
Mysore	18	6,545†	6	107	36,223	98	31,315
Nundydroog*	23	6,322	6	132	33,920	116	27,876
Oregum	10	2,714	6	63	18,578	63	16,163

*Includes tailings.
†Includes 44 oz. recovered from Mill Tank clearing.

Nundydroog continues to maintain the big improvement in throughput and output reported last month but the figures announced by Oregum can only be described as below the average of the first six months of this year.

Company Shorts

£12,500,000 New Funds for Welkom and Presidents Brand and Steyn.—Particulars were made available last week-end of the arrangements made for the financing and refinancing of the three Orange Free State Gold Mines in the Anglo American Corporation of South Africa group—Welkom, President Steyn and President Brand.

The total of new funds involved amounts to £12,500,000 of which £3,000,000 is for Welkom, £4,000,000 for President Steyn and £5,500,000 for President Brand. The major portion of the total funds involved are being arranged for within the Anglo American Corporation group, chiefly through loan facilities or by the Anglo American Corporation purchase of shares. Only in the case of President Brand are existing shareholders directly concerned.

Of the £3,000,000 needed by Welkom Gold Mining, £2,500,000 is required to repay temporary borrowings and the remainder to complete the present capital expenditure programme. Half of this money is to be raised by Welkom selling its holdings of 800,000 shares apiece in President Steyn and President Brand to the Anglo American Corporation. The other £1,500,000 is to be raised through loan facilities granted by the Corporation which will carry interest at the rate of 6 per cent and will be repayable not earlier than the end of 1957 and not later than the end of 1962. The Corporation meanwhile will have the right to subscribe at any time up to the end of 1957 for as many as 1,000,000 Welkom shares at 30s. per share and to have the amount so subscribed used in the reduction of its lendings. The Corporation will also be entitled to call upon the company at any time thereafter for unsecured notes for the outstanding amount of the loans and for quotation of such notes on the Johannesburg and London stock exchanges.

The £4,000,000 required by President Steyn for an acelerated development and production programme is to be provided by loan facilities from the Corporation at 6 per cent of which not less than half will be repayable by the end of 1957 and the balance by December 31, 1962, subject to any reduction by virtue of the Corporation exercising an option to subscribe for 2,000,000 President Steyn shares at 20s. a share up to June 30, 1955. After this date the Corporation may call for the issue to it of quotable unsecured rates for the amount of the loan outstanding.

President Brand is to raise £2,406,250 immediately by the issue of 2,750,000 of its reserve shares of 5s. each at 17s. 6d., and a further £3,093,750 on or about April 30, 1954, by the exercise of option certificates in respect of another 2,750,000 shares to be granted to subscribers of this issue at 22s. 6d. a share on a one for one basis.

Of the 2,750,000 shares to be issued forthwith, 2,500,000 shares are to be offered to stockholders registered on November 21 in the proportion of one new share for every three stock units then held. The remaining 250,000 shares will be subscribed by the Anglo American Corporation which is also underwriting the issue and will lend the company at 6 per cent any money it may require up to April 30, 1954, the last day on which the options may be exercised.

The closing date of the offer of new shares will be December 15. Meetings of the companies to give effect to these arrangements will be held on December 1, for Welkom Gold Mining and on November 17 for President Steyn and President Brand.

Hartebeestfontein Gold Mining Co.—Additional details for the financing of Hartebeestfontein Gold Mining Co. to those already reported in our issue of October 24 were released at the end of last week.

The initial issued capital of the company will be £1,000,000 in shares of 5s. each of which 3,000,000 shares (including 1,116,000 constituting a refund of expenditure incurred) will be subscribed for at par by the various Lucas Block participants, Vaal Reefs, and Stilfontein. The remaining 1,000,000 shares will be subscribed for at 8s. per share by the Anglo American Corporation of South Africa Ltd. and its associates. The total vendor consideration due by the company amounting to £305,450 (including the refunds of expenditure referred to above) having been satisfied, the company will have available £844,550.

Arrangements have been made to borrow from the Anglo American Corporation the sum of £1,500,000 bearing interest at the rate of 5½ per cent per annum and repayable by the allocation of 50 per cent of the profits available for distribution as dividends in each financial year after meeting current capital expenditure and interest charges. There will thus be available as initial working capital the sum of £2,344,550.

Later the company will issue sufficient additional shares to ensure that the sum thereby raised together with the initial working capital and loan facilities for a further £1,000,000 will be sufficient to bring the mine to initial production. The issue of these shares will be made in agreement with the Anglo American Corporation when the funds are required. The Anglo American Corporation has undertaken if so requested by the company to underwrite the issue of these shares for a cash commission of 2½ per cent calculated on the issue price and has undertaken that after the issue of these additional shares it will make available loan facilities for the additional £1,000,000 refered to above on the same terms as the original loan. The total loan facilities granted by the Anglo American Corporation are to be repaid not later than 10½ years after the date upon which the additional shares are issued.

Preliminary planning for the sinking of two shafts and for the construction of ancillary surface works has reached an advanced stage.

The company will mine an area of 4,889 claims in the Klerksdorp area adjoining the southern boundary of the Stilfontein Gold Mining Co.

Anglo-Transvaal Consolidated Investment Co. has been appointed secretaries and administrative and technical advisers to the company.

The Board of Directors has been constituted as follows: Mr. B. L. Bernstein (chairman), Mr. S. G. Menell, Mr. R. B. Hagart (alternate Mr. W. D. Wilson), Mr. L. P. Kent, Mr. R. F. Lapping, Mr. J. D. Mackenzie, Mr. J. C. McIntyre (alternate Mr. H. N. Hart), Mr. H. F. Oppenheimer (alternate Mr. K. C. Acutt), Mr. J. Scott (alternate Mr. C. W. Roper).

Rooderand Main Reef Strengthens its Liquid Position.—During the year to June 30 last Rooderand Main Reef was able to strengthen its liquid position by over £200,000 by disposing of its entire holding of New Union General Industries, Paarl Wine & Brandy Co. and other unquoted shares, as well as certain quoted stocks with a loss of only £13,870 on the share transactions. This shakeout of the company's portfolio has left it with 177 shares in Jeannette Gold Mines as the only unquoted shares held although the company still has large holdings in Free State Development and Investment Corporation, Freddies North and Freddies South, the book value of these three Freddies companies representing approximately 79 per cent of the total book value of its quoted investments, which at June 30, 1952, stood in the balance sheet at £2,744,063. These have a market value of £1,547,948. The net profit for the year to June 30, after providing for all expenses including taxation amounted to £4,155, compared with £55,509. The sum of £250,000 was transferred to general reserve which partly offset the allocation of £450,000 from general reserve to investment reserve and at the financial year end, the forward balance amounted to £117,003 against £352,848 brought in while the general reserve account declined by £200,000 to £1,300,000. The annual meeting will be held in Johannesburg on Nov. 13. Mr. S. G. Menell is chairman.

Southern Kinta Produces More and Pays More.—Southern Kinta Consolidated, Malaya's biggest tin producer, during the year to March 31 last produced 4,021 tons tin concentrates compared with 3,809 tons in the preceding year. Thus, it came as a bit of a surprise to find that profit before tax declined from £1,544,817 to £1,459,111. This was attributable to higher costs, £1,488,948 against £1,238,435 and to liabilities which at £923,000 required £83,000 more than in 1951. Indeed, it was only by reducing the amount written off restoration expenditure from £145,000 to £62,000 and lowering the provision made for river deviations from £230,000 to £100,000 that the available balance for distribution to shareholders at £274,111 was appreciably larger than the amount available in the preceding year of £229,817.

Shareholders, therefore, must be pleased that the total distribution of 50 per cent was 10 per cent more than in 1951. This required £252,525 (£205,026) leaving a balance on the year's operations of £21,586 (£24,791) thereby increasing the

forward balance to £245,296, compared with £223,710 brought in.

The outlook for the current year is reasonably bright. The average price per ton tin has held up remarkably well and with the company's tin production for the first six months of the current year at 2,384 tons compared with 1,916 tons in the corresponding period of the year under review, the current year's profits should approximate to those made in the past financial year.

Naraguta Tin's Revenue Expansion.—The expansion in Naraguta Tin Mines' revenue in 1951 compared with the preceding year was due largely to the income from columbite production which was assisted by higher output and an improved price per ton.

Year to Dec. 31	*Production Tin* (tons)	*Columbite* (tons)	*Gross Revenue* £	*Mining Costs* £	*Tax* £	*Net Profit* £	*Dividend* %
1951	255	54	236,347	183,287	27,250	18,442	7½
1950	234	40	188,960	139,283	26,750	15,161	7½

However, as in the case of other Nigerian tin producers noted in these columns, expenses in terms of per ton costs showed appreciable increases, and this, together with the new scale of royalty charges payable to the Nigerian Government reduced net profit after tax to much the same as in the preceding year. The maintenance of the distribution required £8,663 and after allocating £4,102 to reserves the carry forward amounted to £16,081, compared with £11,241 brought in.

The chairman, Sir Herbert T. Skip, in his statement accompanying the accounts said that in view of the nature of the currently known columbite-containing sections of the company's areas it was not possible to estimate the tonnage of columbite contained nor was it feasible to foreshadow the contingent future columbite recovery from the treatment of old dumps. Nevertheless, the investigations during the year indicated the possibility of future additions and further equipment for the treatment of columbite containing ore and tailings has recently arrived on the company's property.

In the first nine months of the current year production of tin totalled 222 tons and that of columbite 39 tons compared with 177 tons tin and 40 tons columbite in the corresponding period of 1951.

Zaaiplaats Maintains Dividend.—Zaaiplaats Tin Mining Co., the Transvaal tin producer, reported an output of 271 tons tin concentrates for the year ended July 31 last, an increase of 35 tons over the preceding year. The net profit, after providing for all expenses including royalty payments and taxation, amounted to £91,154. The total dividend distribution aggregated 3s. 6d. per 5s. share on the issued capital of £89,250. The sum of £15,244 was expended on fixed assets, £5,000 was allocated to general reserve leaving the carry forward at £68,061 compared with £59,351 brought in.

The annual meeting will be held in Pretoria on November 14. Mr. R. L. M. Warren is chairman.

Trinidad Petroleum Development. Output over 3,000,000 bbl.—For the first time in nine years annual production of Trinidad Petroleum Development exceeded 3,000,000 bbl., the total output of crude oil amounting to 3,091,175 bbl. compared with 2,944,076 bbl. This improvement in production was reflected in the profit and loss account where income from the production account increased to £1,761,860 against £1,648,857. Unfortunately development costs were considerably higher, £790,245 against £654,359, and with taxation liabilities some £18,000 heavier at £448,250, the net profit of £237,063 showed a perceptible drop from the previous year's net earnings of £310,787.

The allocation to general reserve was halved at £50,000, but the total distribution on the 5s. ordinary stock units was maintained at 16⅔ per cent requiring £127,500, leaving the carry forward virtually unchanged at £200,230 against £198,380.

The annual meeting was held in London on October 30. The chairman is Mr. Kenneth A. E. Moore.

Bolivian & General to Repay 6s. Per Share.—Bolivian & General Tin Trust will hold an extraordinary meeting in London on November 11, at which a resolution will be submitted for a cash repayment of 6s. per share thereby reducing the nominal amount of each £1 share to 14s.

Since the last annual meeting, the company has received a further £37,175, which with a similar sum previously received, represents a total repayment of the company's holding of Fabulosa Income Bonds. At the present time the company has approximately £191,000 in cash and quoted investments, and of this amount £150,000, subject to confirmation by the Court, is to be applied in making a cash repayment of 6s. per share. Should the Court's confirmation be received, it is proposed to increase the nominal capital once more to £500,000, but no fresh issue of capital is intended.

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BERALT TIN & WOLFRAM

MR. F. GATES ON THE OUTLOOK

The Twenty-Fourth Annual General Meeting of Beralt Tin & Wolfram Ltd. was held on October 30 at Winchester House, Old Broad Street, London, E.C.

Mr. F. Gates, chairman of the company, presided.

The Chairman, in the course of his speech, said:—

The accounts for the year ended March 31, 1952, now presented, tell a clear story of an exceptionally prosperous year, which leaves the company in a strong financial position. I see little in the figures on which I can usefully comment, but it is interesting to note that out of each £100 realized from mineral extracted and sold, nearly £50 was retained in Portugal by way of wages, purchases of stores, power, etc., and taxation, and that out of the remaining £50 nearly £30 had to be paid in U.K. tax. Out of the surplus of sales proceeds over working costs, over 75 per cent was taken in taxes by the two countries and this percentage may be even greater during the current year, since excess profits levy was only applicable for the last quarter of the year under review.

PRODUCTION AND ORE RESERVES

Production of wolfram and tin concentrates during the year averaged a little over 200 tons per month and a substantial proportion of the wolfram was sold to the U.S. Government in compliance with a request from the Portuguese authorities for sales against dollars.

The rate of production has been maintained since the end of March last at about the same figure but the contribution made by the block of ground immediately above main adit level, the richer areas of which were worked out during the war years, is falling off. Every effort is being made to secure production from lower-grade ground in various parts of the mine which can only be worked profitably while the wolfram price is high and thus to avoid prejudicing the future of the mine by undue encroachment into the high-grade areas in the heart of mineralization on No. 1 level (200 ft. below main adit).

Work on No. 1 level has disclosed a granite-greisen intrusion, the shape and extent of which have not yet been fully determined, and the behaviour of the veins running close to and through this intrusion is being studied. It is certain that mineralized veins persist far below No. 1 level and I am glad to say that Professor W. R. Jones, who carried out a geological examination in May last, has reported most encouragingly on the probability of mineralization continuing in depth.

WOLFRAM SALE CONTRACTS

The Ministry of Materials' buying price for wolfram, which stood at 485s. per unit at March 31 last, has since fallen to 410s., so that the fixed price contracts with the U.S. Government and the Ministry of Materials, of which I spoke to you at our last meeting, for about 40 and 50 l.tons per month respectively at prices substantially higher than the current prices, now stand the company in good stead. These contracts expire at end-June and end-September, 1953, respectively.

In an endeavour to secure the company's position still further ahead the Board have concluded further contracts with the U.S. Government and the Ministry of Materials.

The contract with the U.S. Government, to which reference was made in an announcement in the Press on September 12 last, arose out of the considerable interest which the representatives of that Government have shown in the potentialities of the Vale da Ermida area after an inspection of the area by one of their engineers.

Under the contract the U.S. Government undertakes to purchase up to about 2,500 l.tons of wolfram over a period of five years beginning October 1, 1952, at fixed prices for deliveries during each of those years. The prices for each of the first two years are both well above the current market price and the price fixed for the subsequent three years is not too far below it. The company undertakes to deliver under this contract all wolfram produced from the Vale da Ermida area but it is important to note that it has the right to make up any deficiency from other sources, and the contract terms as regards quantities and times of delivery are very flexible.

More recently still, a contract has been made with the Ministry of Materials for the sale of 100 tons of wolfram per month from October, 1953, to September, 1955, inclusive at the market price current from time to time with "floor" and "ceiling" prices which the Board think reasonable. The company has the right to terminate the contract, should circumstances change so that profitable working at the "floor" price becomes impossible, and the Ministry reserves the right to terminate it not earlier than September 30, 1954, should they cease to control wolfram in this country.

MONTHLY DELIVERY FIGURES

In order to give the clearest possible summary of the outstanding contracts I would explain that the company is entitled thereunder to make monthly deliveries of wolfram concentrates as follows:—

Until end June, 1953—130 tons at fixed prices and 50 tons at the market price current from time to time.

From July 1 to September 30, 1953—90 tons at fixed prices and 50 tons at the market price.

From October 1, 1953, *to September* 30, 1954—40 tons at a fixed price and 100 tons at the market price subject to agreed "floor" and "ceiling" prices.

From October 1, 1954, *to September* 30, 1955—The same as for the previous year, subject to the Ministry's right to terminate the contract for 100 tons per month.

From October 1, 1955, *to September* 30, 1957—40 tons at a fixed price.

NEW AREA

The conclusion of this new contract with the U.S. Government justified the Board in pressing on vigorously with the preparations for bulk testing of the Vale da Ermida area and with the reconditioning of the old mill at Panasqueira. It is expected that bulk tests on ore extracted from the area will be commenced early in 1953; future plans will, of course, depend upon the results disclosed by these tests. If the recovery of mineral is such as to permit profitable operation at normal tin and wolfram prices, the large tonnage of mineralized ground in the area will constitute an important addition to the company's ore reserves and our production of tin concentrates will be appreciably increased. The opportunity is being taken to re-open some of the old wolfram stopes at the top of Panasqueira hill, ore from which can conveniently be treated in the Panasqueira mill.

The opening up of the Vale da Ermida area and reconditioning of the Panasqueira mill, together with the maintenance of normal output from the River mill, have imposed a heavy burden on our general manager, Mr. G. A. Smith, and his assistants, both British and Portuguese, and it is again a pleasure to pay a well-deserved tribute to them for their wholehearted and efficient services which have contributed so greatly to the company's present prosperity.

The report and accounts were adopted.

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KENTAN GOLD AREAS

The Annual General Meeting of Kentan Gold Areas Ltd., was held at 20 Aldermanbury, E.C.2 on October 30.

The Right Hon. Earl Grey presided.

The following is the chairman's review which was circulated with the report and accounts:

A full report on the operations of the Geita Gold Mining Co. Ltd. for the year ended June 30, 1952, submitted by New Consolidated Gold Fields Ltd., who were appointed Consulting Engineers to the company for two years from August 1, 1951, is attached hereto. Their advice has already been of great assistance to the Geita Management, and should gradually help to bring about a substantial improvement in the Geita Co.'s operations.

Your director, Mr. G. F. Webster, C.M.G., visited Tanganyika in April last. His visit had valuable results and was greatly appreciated by the Geita Management and staff.

The following additional remarks deal primarily with the accounts and financial position of the Geita Co.

The operating profit for the year was £39,416 as compared with £81,719 for the year ended June 30, 1951. After charging £48,256 for depreciation and making provision for debenture and loan interest, the loss for the year was £54,100 as against £6,882 for the previous year. The balance of loss at June 30, 1952, amounted to £445,146.

Loan from Tanganyika Holdings Ltd. remains at £300,000 and interest thereon from January 1, 1949, amounting to £52,438, has not yet been paid. Redemption of the Debenture Stock and premium thereon, totalling £427,200, has been further postponed until June 30, 1954, and payment of interest on Debentures, accrued from January 1, 1947, has been postponed until the same date. Thanks are due to Tanganyika Holdings Ltd. for agreeing to this further postponement which it is hoped will enable the Geita Co. to put itself into a better position for the re-organization of its finances.

Expenditure on Capital Account amounted to £29,373, of which £14,787 was on buildings, £7,548 on plant and £6,650 on transport units.

During the year under review 47 per cent of the gold produced was sold at a premium. After deduction of processing charges in respect of these sales, the average premium on the total production was 7s. 8d. over the standard price of 248s. 3d. per f.oz. The Tanganyika Government has now permitted the sale of the whole of the output in fine gold on the free dollar market, thus saving the processing charges. At prices ruling during the first quarter of the current financial year, the premium realized has been between 20s. and 21s. per f.oz., but free gold prices have been tending to fall.

The working costs per ton milled exceeded those of the previous year by 1.16s., which compares favourably with the increase of 2s. 6d. per ton in the average working costs of the South African Gold Mines over the same period. Broken ore stocks in the various mines increased by 41,000 tons during the year, and if allowance is made for this it will be seen that costs have been held to approximately the same as in the preceding year despite increased costs of supplies and labour. Native wages, feeding and compound expenses increased by 24 per cent per labour unit but better labour utilization and efficiency offset this increase.

As pointed out by the Consulting Engineers, prolonged delays in delivery of orders, particularly for iron and steel supplies, and shipping delays from this country to East Africa made it difficult to maintain adequate stocks of consumable stores at the mine. It is not unusual for goods to take eight or nine months to reach the mine after they are ready for shipment. Throughput was restricted in part of June, July and August through the late arrival of liners for the Marcy Ball Mill which were in a steamer waiting over five weeks off Mombasa for an unloading berth. Messrs. New Consolidated Gold Fields have been most helpful in arranging supplies of essential materials from South Africa which were not readily available from this country.

During the year the operations of the Geita Co. have been hampered by mechanical breakdowns, the most serious of which have been in connection with the power plant and are in course of being remedied. As a result of these setbacks and the necessity for providing increased stocks, the company required additional finance to carry on its operations and provide for further development.

Since the end of the financial year, your Board has therefore agreed to an advance of £27,500 on similar terms to those governing the loan from Tanganyika Holdings Ltd. According to the Geita Co.'s estimates, this should be sufficient to enable the company to meet expenses and lead to a profit-earning stage.

The chairman added that the assistance of New Consolidated Gold Fields Ltd. had greatly encouraged the Board, and went on to give production figures for the three months July to September, 1952, stating that 8,912 f.oz. gold had been produced from 58,500 tons of ore milled, at an average cost of 36.81s. per ton and yielding an operating profit of £11,755.

In order to provide additional finance to enable the Geita Co. to carry on its operations and undertake further development, the Board had agreed to an advance of £27,500 which should be sufficient to meet expenses and lead to a profit-earning stage.

The report and accounts were adopted.

UNION FREE STATE COAL & GOLD MINES LIMITED

(Incorporated in the Union of South Africa)

Extracted from the Annual Report for the year ended June 30, 1952

AUTHORIZED CAPITAL **£2,000,000**
ISSUED CAPITAL (in 7,377,450 shares of 5s. each) £1,844,363

PROPERTY

At June 30, 1952, the Company's property, excluding the mineral rights over 3,831.2 morgen constituting the Harmony Mining Lease Area, comprised:

MINERAL RIGHTS: Coal—7,472 morgen in the Transvaal; 1,423 morgen in Natal; 2,016 morgen in the Orange Free State. MINERAL LEASES: Coal—6,556 morgen in Natal. FREEHOLD AND LEASEHOLD (excluding Mineral Rights): 5,151 morgen in the Transvaal; 6,683 morgen in Natal. OPTION AND PROSPECTING CONTRACTS: Coal—1,393 morgen in the Transvaal; 1,272 morgen in Natal; 2,465 morgen in the Orange Free State. PROSPECTING CLAIMS: Coal—957 morgen in Natal. (NOTE—The abovementioned areas are shown to the nearest morgen.) BUSINESS ERVEN: Two properties in Middelburg, Transvaal. One property in Newcastle, Natal.

HARMONY GOLD MINING CO. LTD.—During the year this company provided Harmony Gold Mining Co. Ltd. with temporary loan facilities of £1,050,000 at 5 per cent per annum. The amount drawn, together with interest, amounted to £1,091,331 and was repaid by Harmony Gold Mining Co. Ltd. when that company increased its issued capital in March, 1952. Of the 5,600,000 shares which Harmony Gold Mining Co. Ltd. offered at 18s. 6d. per share, this company became entitled to and subscribed for 1,273,261 shares bringing the total number of Harmony Gold Mining Co. Ltd. shares held at June 30, 1952, to 3,092,206.

An extract from a statement by the chairman of the Harmony Co. regarding its operations which accompanied its recently issued annual report is included in the Directors' report of this company.

OPERATIONS

TRANSVAAL

RALEIGH COLLIERY—The main preparation plant handled only a restricted tonnage of coal during the year, due mainly to structural failures, an unsatisfactory medium circuit and an inadequate screening area for raw coal. Every endeavour is being made to remedy these defects as expeditiously as possible. The colliery has not yet taken over the plant from the contractors.

Severe faulting and dyke intrusions in the mine have created difficult floor and roof conditions and have militated against the efficient use of the mechanical handling equipment, resulting in heavy maintenance expenditure. The working loss for the year was £32,067 due to the varied and serious technical difficulties which have confronted the colliery and to the shortage of railway transport. The coal preparation plant and the mechanical handling equipment were purchased for the colliery before the present Board assumed control of the company's affairs.

Development in the vicinity of the shaft has revealed considerably larger areas of burnt coal and broken ground than was expected and as a result the immediate reserves of coal have been reduced to a dangerously low level. It has been decided, therefore, to drill further boreholes in the eastern portion of the property in order that a more detailed assessment can be made of the extent and consistency of the coal seams in this area. In the meantime, the future prospects of the colliery are being carefully considered by the Board in the light of the technical information available and the financial position of the company. Shareholders will be informed in due course of any decisions that may be taken.

CAROLINA DISTRICT—Additional drilling has confirmed previous results indicating that this area is underlain by coal seams of medium grade. Option contracts have been obtained over certain farms adjoining the company's holdings and since the close of the financial year certain of these in respect of 1,173 morgen have been exercised.

NATAL

NEWCASTLE DISTRICT—Additional drilling on the farms Braakfontein, Drycut and Shuttleworth took place during the year and the company exercised its options to purchase the freehold owner's rights over the farms Drycut and Shuttleworth. Preliminary tests and investigations indicate that the grade of coal underlying this area is not sufficiently high to warrant consideration being given to its exploitation under present conditions. Drilling results on the farm Tuam which adjoins Braakfontein were poor and the claims held by the company over this farm have been allowed to lapse.

FARM ELANDSLAAGTE—Additional drilling on this farm continued to give disappointing results.

FARM ROY POINT—Drilling is in progress on the adjoining farms Tigerkloof over which an option is held and portions of Bosch Hoek over which option contracts have been obtained since the close of the financial year in order to determine the extent of the coal seams disclosed on Roy Point.

VREDE DISTRICT—Drilling on farms in this area has not been encouraging and the lease over the farm Kliprand will be allowed to lapse on due date.

ORANGE FREE STATE

HEILBRON DISTRICT—Certain options held by the company to purchase coal rights in this area have been exercised and options have been obtained over portions of an adjoining farm.

NET ASSETS—At June 30, 1952, the company held investments, cash and cash assets totalling £1,807,742 less Liabilities and Provisions £43,001, net £1,764,741.

The full Report and Accounts may be obtained from the London Secretaries, A. MOIR & CO., 4 London Wall Buildings, London, E.C.2.

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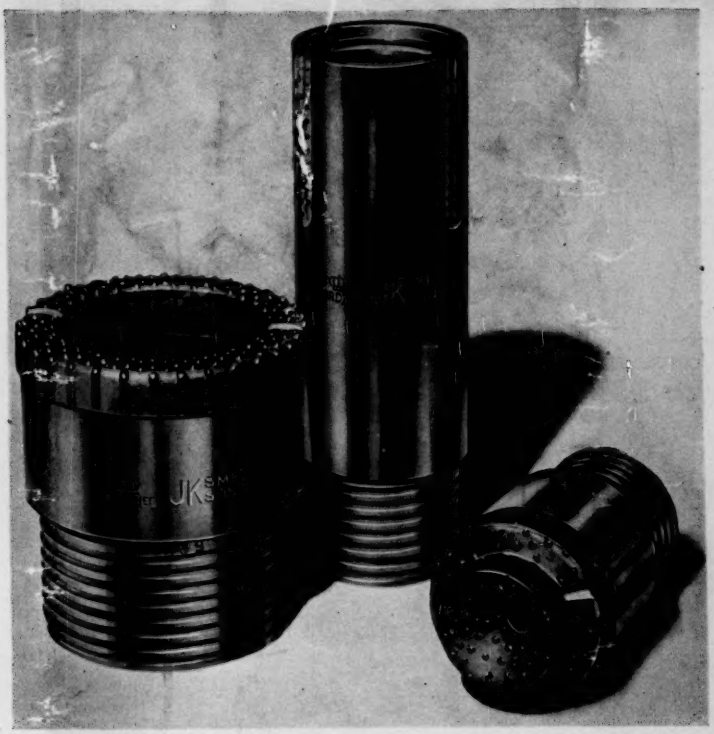

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